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THE
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Original Articles.

ON HYSTERO-EPILEPSY.

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DURING the last few years, our medical nomenclature has been enriched by the addition of the term Hystero-Epilepsy, and our medical literature has been teeming with minute details of clinical cases, illustrating this form of nervous disease, and some of the leading neurologists in all parts of the world, but preëminently Professor Charcot, have been engaged in investigating this obscure feature of nervine pathology.

I will not trespass upon the space allotted to me by discussing the appropriateness or otherwise of the term, but, having had the opportunity of closely watching three cases of unusual interest, I propose giving a short account of each, prefacing what I have to say with a few remarks as to what is understood by the somewhat vague and, I admit, disputable term—hystero-epilepsy.

A recent author, Professor Gamgee, of Manchester, summarizing the salient points of this disease, describes hystero-epilepsy as a nervous disorder of women, of great

rarity, affecting them especially during the child-bearing period of life; sometimes, though rarely, occurring before the actual commencement of menstruation and continuing after its cessation. It is associated with hyperæsthesia in one or both ovarian regions, and is usually attended with hemianæsthesia and more rarely by anæsthesia of both sides of the body. There is some if not complete loss of tactile sensibility, and usually absolute insensibility to pain (analgesia) of skin and all other sensitive structures on the affected side; the muscular sense being, however, nearly always preserved. The essential and pathognomonic sign of the disease is the occurrence of attacks, which present remarkable phenomena in a definite order: at first epileptiform, then affecting the mental functions of the patient, who, by gesture and actual utterance, reveals to the spectator various phases of emotional activity.

I will now proceed to the detail of my own cases, which illustrate some of the exceptional as well as the more common features of this curious disorder.

CASE 1.—On March 1, 1880, I was summoned to a distant part of the country to see, in consultation with Mr. Marriott, of Swaffham, a young girl eleven years of age, of a highly sensitive and precocious temperament, who had never menstruated, and who had caused considerable anxiety to her relatives by the manifestation of certain somnambulistic and cataleptic symptoms. Mr. Marriott, who had carefully watched the case for several months, kindly supplied me with the following antecedent history: In June, 1878, she had a fall from a pony, which jarred her a good deal; soon afterward she had spasmodic sneezing, running at the nose, and itching at the ears. Every now and then the sneezing returned with considerable force, and lasted for some time. About a year later she received a severe blow on the forehead, and the next day was attacked with rapid spasmodic hiccoughs, so quick as to make a sound like the word "*hutching*," repeated as quickly as possible, and these seizures were called "*hutchings*" by those around her; there was no pain at the seat of injury, and she was otherwise quite well. It would be tedious

to dwell further on the history of the case up to the time of my visit, characterized as it was by occasional hysterical sobbings, jerking of the limbs, pain down the right leg, and tenderness in the left iliac fossa.

On the evening of my visit she was fairly quiet and composed, till about twelve o'clock, when the most strange combination of somnambulistie, cataleptic, and epileptiform symptoms manifested themselves. Her first delusion was that she was bathing in the sea ; she ducked, jumped off her bed, as if off a bathing-machine steps. Next she was riding sideways on the bed, and made noises to her pony, jumped a ditch, found a fox, and then asked the master of the hounds for the brush. I ought to add that she resided in a sporting country, and her parents were fox-hunters. Shortly afterward she was at a dancing lesson, danced a waltz, a polka, and one figure of the Lancers, singing the music the whole time. Finally she imagined herself at an amateur concert, and mimicked a gentleman whom she knew well, sang one of this gentleman's songs, acting it at the same time, as it is partly comic, and then said: "Does not that gentleman sing well?" "Bravo! Mr. Jones," she said, and then she clapped her hands in applause. She also, whilst in this somnambulistie condition, sang various bits of songs and glees, mostly from the popular play of "Pinafore." During these fits of emotional activity her eyes were always shut; each fit would last from ten minutes to a quarter of an hour, then she would sneeze three times, open her eyes, and all would be right for a time.

I will reserve all remarks about the treatment of this case till I have briefly related the two other cases of which I have to speak.

CASE 2.—I do not propose to dwell upon this case at any considerable length. The subject of it was a young man, aged twenty-three, whom I saw in consultation with Dr. Watson, of Norwich. There was no history of insanity, epilepsy, or other nervous disorder in his family. About two years previously he had complained of pains at the top of the head, which his friends attributed to a sunstroke, also of a feeling of having something in his throat which prevented him from swallowing; he took twice as long to eat his food as other people; he also complained of coldness and stiffness of the extremities. There, however, had been no fit of an hysterical or epileptic character, till one morning,

shortly before I saw him, he asked a female relative to remove the knives from the table, as he felt he must do something to himself ; immediately afterward he threw himself down on the couch, flung his arms about, with his fists clenched, as if wanting to strike some one ; there was some frothing at the mouth, with muscular rigidity. This fit lasted for an hour or more, during which time he had to be held down by two men. The fits generally began with jerking of the muscles of the extremities, and passed off by his shaking violently all over, making the ornaments on the mantel-piece shake. After a fit he generally fell asleep, but there was none of the stertor or profound unconsciousness of true epilepsy. The rigidity of the muscles was almost of a tetanic character. This patient, under the influence of bromide of potassium and valerian, recovered and resumed his occupation ; but at the end of a year he had a relapse, and general convulsions were induced by the slightest exciting cause, and I could bring on a convulsion myself by simply touching him ; and the application of the stethoscope to either side of the thorax would instantly bring on a convulsion in the leg of the same side, the convulsions being of such severity as to shake the bed to such a degree, that the members of the family in the rooms below could always perceive when the convulsions were upon him. The treatment in this case consisted in painting the spine with iodine, and in the administration of a quarter of a grain of extract of *cannabis Indica* every two hours, and the patient became convalescent in about a month.

CASE 3.—In the month of October, 1878, I was requested to see, with Mr. Bayes, of Walsingham, a young lady aged twenty, who had fallen from her horse sixteen days previously, did not seem to be much hurt at the time, got up, rode home, and was able to play a game of cards in the evening. Three days afterward she lost the use of her left leg, but recovered it however in a few hours ; there was anæsthesia below the left knee, and hyperæsthesia above it ; at, or about the same time, convulsions of a peculiar character set in, and as she had fallen on her back, it was thought that she might have sustained some surgical injury to the spine, and Mr. Cadge, of Norwich, and her own medical attendant from London were asked to see her, but these gentlemen could detect no spinal injury. After one or two days, the urgent symptoms abated, and she seemed going on well, when the convulsions returned, and I was summoned. When I first

saw her she was calm and seemed to ail nothing. I requested her father to lift her into the sitting posture, and proceeded gently to tap the spine, when percussion over the lumbar vertebræ made her wince a little. Whether from the change of position or from my examination, the convulsions returned immediately, and lasted more or less for two hours and a half. They were peculiar in character: she threw her arms about, stood up in the bed, opened her mouth very wide, then threw herself down on the bed, and rested on her heels and head, in a state of opisthotonos; she would then maintain her rigid limbs in one position, in a cataleptiform manner; there were spasmodic movements of the jaw, and now and then a shriek. We succeeded in quieting her by the administration of ether mixed with a little chloroform. I may add that Mr. Bayes had sat up with her the previous night, and had given chloroform repeatedly as the only means of checking the convulsions. The respite afforded by the inhalations was only temporary, as she soon broke out again, to be again relieved by the ether and chloroform, and we left her calm and collected and able to take food. I prescribed 3j of tincture of hyoscyamus and 3ss of tincture of sumbul every four hours. She went on well for about a week, when there was a return of the convulsions, but of a less violent character. Then there was a respite of fourteen days, all seemed going on well, menstruation occurring at the proper time and in the proper quantity. When this function was over, she began to complain of her head, became very drowsy, or rather took to sleeping continually, and as she had slept (with but slight intervals of a minute or two) apparently in a trance for forty-eight hours, the relatives became alarmed; it was thought that she was dying, and I was again summoned. When I arrived, I at once reassured the relatives, as I felt sure the danger was only apparent, for although she had been so long unconscious, I found a good pulse, particularly easy respiration, skin nice and warm, some color in the face, and no dilatation of the pupils. In fact, she was, and had been for forty-eight hours, quietly sleeping, without the least stertor—call it if you like an hysterical trance. I noticed there was tenderness on pressure in both ovarian regions. I directed a mustard poultice to be applied to each calf, and in about half an hour she woke up and appeared quite herself again; an assafoetida injection was then given, and tincture of valerian administered internally three times a day. A few days later, she was put upon a medicine that I had not previously tried—bromide

of camphor in three-grain doses three times a day. This last medicine seemed to do good. As she now complained of hypogastric uneasiness, a uterine examination was made, and the os was found turned toward the pubis ; this examination, however, threw the patient into a state of insensibility, and it could therefore be but imperfectly done. A few days later Mr. Bayes was enabled to make a more complete examination, and quite satisfied himself that there was retroversion of the fundus. We adopted the proper means to replace the uterus, and the feeling of weight and uneasiness was at once removed. Further details would be wearisome. I will merely add that in the course of a few weeks this young lady got quite well.

The above three cases illustrate a class of nervous disorder which is attracting much attention just now, an interesting discussion upon this subject having recently taken place at the annual meeting of the British Medical Association at Cambridge. At this congress, the President, Dr. Paget, very properly remarked that the disorder was not confined to females, and it will be observed that one of my cases was a male. I agree, moreover, with Dr. Paget, that although the term *hysteria* may be objectionable, it has passed into our medical nomenclature, and may be accepted, and *hystero-epilepsy* seems an appropriate term to designate the peculiar train of symptoms I have described. Dr. Matthews Duncan, one of the speakers at the Cambridge meeting, dwelt at some length on the part played by the ovaries in this affection, and he doubted the universality, if not the frequency, of this complication, and he mentioned three cases in which the so-called ovarian symptoms were absent. Another speaker, Dr. Gowers, remarked that ovarian tenderness was present in at least half the cases. It will be observed that in each of my two female cases, ovarian tenderness was present.

A question here arises as to the pathology of this disorder. A leading English neurologist has suggested that in a large number of cases an emotional cause gives rise to the first phenomena, "thus causing a shock to the highest

centres and altering their action." In two of my patients this was the case, both having had a fall from a horse, causing a certain amount of concussion of the spine. All my three cases resembled each other in one particular—they all simulated dangerous disease, and in two of them the relatives apprehended a fatal result, although in none of them were there any real grounds for such an opinion, and they all eventually recovered.

As to treatment, the bromides were given in each case with but doubtful advantage. In case No. 3 I determined to try the bromide of camphor, which seemed to be of service. A method of treatment is being adopted in such cases as these which would savor of quackery if it had been pursued by a less competent authority than Professor Charcot; I allude to metallo-therapy. More than twenty years ago a Dr. Burq, a French physician, stated that in certain conditions of the nervous system plates of metal placed upon the skin had the power of altering general and special sensation. This doctrine has been revived and further developed during the last few years by some of the leading physiologists of the day. I was induced to try it in two of my cases. I am far from supposing that it was a powerful factor in their recovery, although in the case of the young girl its application coincided with a marked improvement, which may, however, have been due to what is called "expectant attention," for deeming it desirable powerfully to affect the nervous centres of the patient, I advised the application of a silver plate to each arm, telling the girl at the same time that it was sure to cure her.

The phenomena in the above cases were extremely complicated and varied, and the clinical symptoms were daily recorded in a very detailed manner. I have therefore thought they might properly form the subject of a brief communication to this JOURNAL.

Norwich, England, Oct., 1883.

DETENTION IN ASYLUMS.*

BY RALPH L. PARSONS, M.D.,

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AN observant visitor, on passing through the wards of almost any large asylum for the insane, will probably notice patients who appear to be, and perhaps are, fully convalescent; and others who, although not altogether of sound mind, appear well enough to be entrusted to the care of their friends, without danger to themselves or others. The inference is sometimes drawn that some at least of these convalescent patients are unjustly detained, either through negligence, or through improper influences and motives; and also that many of the harmless patients are unnecessarily and hence unjustly detained.

Without attempting any prolonged discussion of the question whether possibly there may not be cases in which patients are improperly detained through interested motives, or through neglect, it will undoubtedly be found of interest to make inquiry whether, in fact, improper detentions are of frequent occurrence; and also how soon convalescents should be discharged; and whether uncured patients might not with greater frequency be relieved from asylum restraints and placed in charge of their friends, or in private families.

While it may be admitted that unjustifiable detentions

* Read before the New York Neurological Society, Jan. 8, 1884.

are quite possible, as any other sort of injustice is possible on the part of persons holding positions of power and responsibility, there are many reasons for believing that convalescent patients are very seldom indeed maliciously detained by physicians in charge of asylums. Aside from considerations of honor and humanity, professional pride is a motive that strongly induces physicians to report as many cures as possible; their professional reputation would be ruined if they were convicted of such malicious detentions; they would be liable to a civil suit for damages, and detection would always be imminent. The convalescent patient would rarely have much difficulty in getting a public hearing of his case, as is shown by the facility with which patients who are undoubtedly insane get such a hearing in the courts. Attendants and other employees, assistant physicians, trustees of the institution, friends of other patients, and the State Commissioner in Lunacy are all sources of danger which would seem sufficient to deter any physician of ordinary prudence from committing the crime in question, even if he might otherwise be disposed to yield to the persuasions and bribes of parties interested in having the injustice perpetrated. In view, then, of the strong motives which exist as deterrents from malicious detentions, and of the fact that so few of them come to light, notwithstanding the many sources through which the fact of the wrong-doing can be made known, it may fairly be assumed that malicious detentions are of very infrequent occurrence.

It is quite possible, however, that convalescents may sometimes be detained longer than they ought, through excess of caution, through lack of a reasonable confidence in the stability of apparent cures, or through lack of a proper appreciation of the importance of discharging convalescents as soon as this can be done with safety. At all

events, it is of considerable importance that general practitioners of medicine and physicians in charge of asylums should have a mutual understanding of the main facts which underlie the decision of the question.

The mere fact that convalescent patients may at all times be observed in the wards of large hospitals for the care and cure of the insane, is not at all surprising. If patients are cured at all, there must, of necessity, be some sort of probationary period between the disappearance of all symptoms of disease and the recognition of the change in condition as a cure, rather than a mere amelioration; and a certain period of time may also be required to make suitable and necessary arrangements for the removal of the convalescent.

In many cases there are special reasons, however, which render a somewhat prolonged probation of great importance to the welfare of the patient, as a preliminary step to his discharge and return to the duties and trials of his business, or of his home. In this respect his needs do not differ from those of many convalescents from other diseases whom their medical advisers find it important to dissuade from undertaking their ordinary duties as soon as actual disease has disappeared, but before full strength of body has been regained and while danger of a relapse may be still imminent. And physicians are fully aware how difficult it often is to get this cautionary advice heeded.

In mental diseases the danger of a relapse, or, at least, of a recurrence, is greater than in most other diseases. Regarding relapses, Dr. Thurman, after an exhaustive study of the statistic of insanity, states as follows, to wit: "In round numbers, then, of ten persons attacked by insanity, five recover and five die sooner or later during the attack. Of the five who recover, not more than two remain well during the remainder of their lives; the other three sustain subsequent

attacks, during which at least two of them die." It is true that many of these recurrences do not take place until after considerable intervals of time ; but, on the other hand, in many instances a premature exposure to the trials and annoyances of ordinary life has been followed by an immediate and dangerous relapse. It should be remembered that the immediate cause of the attack, in very many cases of insanity, intimately depends upon the worries connected with their business or with their domestic relations, and that, when they return to their homes, they will almost unavoidably be exposed to the very influences which acted as exciting causes of their insanity in the first instance. In all such cases, then, it is evidently the duty of the conscientious physician to advise a somewhat prolonged delay, before returning to their homes ; and if their retention at the asylum is the only feasible means of securing this desirable end, there should certainly be no hesitation in advising this course. If it be said that patients who have been insane, and who appear to have regained the use of their reason, cannot be properly, nor legally, detained a single moment against their will, it may be replied that patients who are really convalescent are usually quite ready to accept the kind advice, in such matters, of those who have been instrumental in effecting their cure. To this rule there are very few exceptions ; so few, in fact, that if the apparent convalescent stubbornly refuses to consider such advice, when kindly given with the reasons therefor, it may fairly be considered questionable whether convalescence has really been established. Still, in the case of a man or woman of affairs, it would undoubtedly be safer for the physicians, if not for the patient, that he be allowed his full liberty as soon as he appears to have recovered, if he should refuse to accept the advice given.

If it be *known* that the insanity was caused by domestic

infelicities or by business worries, to which the patient will be again certainly exposed on his discharge ; and especially if the insanity have been characterized by dangerous impulses against parties with whom he would be brought in close relation, a somewhat prolonged probationary detention may become clearly advisable.

In some cases of insanity, partial or complete relapses occur one or more times during the progress toward recovery. Hence, although during the remissions the patient may appear to be quite well, it is often essential to his welfare that he remain until a remission has been so prolonged that the danger of a relapse need no longer be feared. If, however, the case develop as one of recurrent insanity, which is probably incurable, if the attacks are not dangerous in character, and the patient have a suitable home from which he can be promptly returned to the asylum whenever this becomes necessary by reason of a renewed attack, there would be no valid excuse for his detention during the period of remission.

There is still another class of patients in which a rather prolonged probationary detention may be advisable after convalescence would appear to an ordinary observer to have been fully established ; that is, cases of delusional insanity, in which the delusions have not been freely expressed, and in which the amelioration has been gradual and prolonged. If in such cases the patient would be subjected to unfavorable influences after his discharge it is safer to prolong his probation than to incur the risk of a relapse which might follow a premature exposure to causes of mental disturbance. If, however, such patients would be placed under favorable conditions after their discharge, it is often advisable to take this step at an early day, as the change may encourage the patient and confirm or hasten his convalescence.

Under the following circumstances patients should be discharged with promptitude after convalescence has taken place,—that is, when the physical health has been fully re-established ; the recovery has been steadily progressive, prompt, and full ; and the conditions and influences under which the patients are to be placed are likely to be favorable, or at least not unfavorable.

But there are many patients who have not yet recovered, and who never may recover, whose detention in asylums for the insane is neither necessary nor advisable, if they have suitable homes to which they can be removed, or if such homes can be provided for them.

During the early stages of the disease there may be, and usually are, many reasons which render hospital treatment highly advisable, if not an actual necessity. The early stage is usually the acute, the active, the troublesome stage of the attack ; the friends of the patient are unused to the care and management of such invalids, and by reason of their consanguinity and previous intimate relations with the patient are likely to be especially unnerved and unfitted for the task. It is then still uncertain what the developments and course of the disease will be, whether suicidal or homicidal or violent propensities will be manifested ; and, moreover, the early is the curable stage, so that it is of the highest importance to the patient, as well as to his friends, that he at this time have the advantage of such skilful care and treatment as are most likely to bring about his recovery.

Later in the progress of the disease the condition of the patient has oftentimes changed very much for the better, or, at least, his insane life has become well understood, so that now his conduct under given conditions and circumstances may be foreseen with nearly if not quite as much precision as in the case of persons of sound mind. Many of these incurable patients who are now habitually detained

as life-long prisoners in asylums for the insane might undoubtedly be allowed to enjoy the comforts and pleasures of ordinary family life without danger to themselves or others. For however comfortably housed, fed, and cared for, a patient who still retains a fair amount of intelligence may be in a large hospital for the insane, there are very few of such patients who would not be much happier if they could participate in the occupations, pleasures, and amenities of ordinary family life. It may be objected that the term *prisoner* cannot be properly applied to patients who are placed in asylums for care and treatment ; and, moreover, that very few of those who are fitted for private life would look upon their detention in the light of an imprisonment at all. To this it might be answered that many of them do look upon their detention as a virtual imprisonment, and would gladly embrace the opportunity to regain somewhat of the liberty they have lost if it were offered them. If it be a fact that many patients appear to be well contented with their asylum life, and that they might be unwilling to leave a place which has become to them a sort of home, the fact would not by any means prove that their condition might not be improved by a change to some other sort of life, any more than contentment in a state of ignorance or of slavery would prove that ignorance or slavery was desirable or best.

The following quotation from the writings of Dr. John Charles Bucknill may be adduced in support of the views which have just been expressed, to wit :

“ Every one acquainted with domestic treatment will feel assured that Mr. Phillips’ explanation only applies to asylum lunacy, and that it is, to a great extent, the misery of imprisonment which begets the strong sense of wrong. The aversion which most lunatics have to an asylum is, no doubt, not altogether a rational sentiment. But, if we re-

flect that, with what mind he has left, a lunatic feels the stigma of detention in an asylum; that, moreover, the restraint of limited quarters and narrow bounds is irksome to him; that he resents the inevitable association with distasteful companions, perhaps not more insane than himself, but different, and therefore offensive; and, if he be a man of culture and position, that subjection to the men who for low wages accept the duties of the attendants, is often felt by him to be unspeakably degrading; and that to all this may be added the conviction that he is deserted by those who owe him positive care and tenderness, we shall scarcely need to follow Mr. Phillips in attributing all his complaints and his sense of wrong to insane conceptions."

Dr. Henry Maudsley writes as follows on the same subject, to wit:

"I feel most earnestly that I should infinitely prefer a garret or a cellar for lodgings, with bread and water only for food, than to be clothed in purple and fine linen and fare sumptuously every day as a prisoner. I can well believe that all the comforts which the insane person has in his captivity are but a miserable compensation for his entire loss of liberty; and that they are petty things which weigh not at all against the mighty suffering of a life-long imprisonment. I would put it to those who lay stress on the comforts of asylums, whether they sufficiently consider the discomforts of them apart from the imprisonment, which they are by the nature of the case. Is it not a common thing to hear from an insane person bitter complaints of the association he has in the asylum, and of the scenes of which he is an unwilling witness—scenes which cannot fail to occur, notwithstanding the best classification, where all sorts and conditions of madness are congregated together? What, again, can be conceived more afflicting to a man who has any intelligence and sensibility left than the vulgar

tyranny of an ignorant attendant—a tyranny which the best management cannot altogether prevent in a large asylum? And I might go on to enumerate many more of the unpreventable miseries of life in an asylum, which, while superintendent of one, forced themselves painfully upon my attention, and often made me sick at heart.”

Very many cases of chronic insanity have been in times past and still are living in private families without being subjected to the restrictions and disagreeable annoyances incident to asylum life, and without danger or serious annoyance to others.

It may be considered as an established fact, then, that many insane patients, who were properly placed in asylums for care and treatment during the early stages of the disease, might as properly, and with benefit to themselves, be removed after the disease has become chronic and probably incurable.

The important question remains to be decided: What class of incurables might thus be removed, and under what conditions and circumstances their removal would be justifiable or desirable?

It may be premised that any insane person, whether in the acute or chronic stage of the disease, can be cared for at least as well outside the walls of an asylum as within, provided the friends are able and willing to incur the very considerable expenditure required. The present inquiry has no regard to this class of patients, but rather to those of ordinary means, or wholly without means, who must of necessity be maintained at a moderate expense, and hence either as inmates of large establishments, or as members of ordinary private families.

Since, then, a moderate cost for maintenance is an important and, in fact, an essential element in the problem, all patients must of necessity be retained under asylum

treatment who would require especial care or supervision if at large as inmates of private families.

Hence noisy, violent, mischievous, homicidal, suicidal, or disorderly patients are evidently of those who must be detained.

So, too, patients who are orderly and reliable a portion of the time, but are subject to sudden exacerbations of excitability, need to be under asylum supervision and restraints.

There are many patients, however, who have never been disorderly nor outwardly disturbed, who are much more dangerous in their impulses and propensities than the classes above mentioned, and whom it would be unwise to allow the liberty of the family, however quiet, orderly, and even rational they may appear to ordinary observers. Among these may be mentioned those who entertain delusions of persecution; those who entertain fears of personal injury; those who imagine that conspirators are plotting to deprive them of their property, their liberty, or other of their rights; those who think that relatives who owe them especial regard or fealty are untrue to them, as that the wife has illicit relations with other men, or the children have procured their imprisonment in an asylum for the purpose of getting control of the paternal estate; those who are vindictive in character, and who have strong personal antipathies; and those who are not frank and full in the expression of their delusions, views, and feelings.

But after all such patients have been excluded, as unfit to be entrusted with that measure of liberty which the children of any well regulated family may enjoy, there remains a very considerable number of uncured patients in asylums for the insane who have become so harmless and unobtrusive in their conduct that they might safely enjoy and, if possible, ought to be allowed this measure of liberty.

Of such patients are many of those who have become useful members of the asylum household. In fact, those patients who have become industrious in their habits are, on this account, much less likely to require asylum detention than those who have not acquired, or who have never had habits of industry. But, without including harmless demented and those who have become physically helpless, the harmless incurables are by no means confined to the industrious class. All chronic cases of insanity in which the acute symptoms have given place to quiescence of thought, feeling, and action are entitled to have their claims to an enlargement of their liberties carefully and candidly considered. Moreover, it will undoubtedly be found during the process of enlargement that not a few of these incurables who are restive and troublesome under the restraints and annoyances of asylum life would be found entirely docile and in every way improved under the genial influence of the home life.

As an illustration of what may safely be accomplished in the enlargement of uncured lunatics, reference may be made to such cases as have from time to time been removed to their homes by their relatives, or have been released by order of the courts. A case in point is that of a woman who had been many years an inmate of the New York City Lunatic Asylum, and whose friends, distant relatives, had always considered her as quite unfit to be a member of their family circle. When the patient became an heiress, however, to the amount of ten or fifteen thousand dollars, these same relatives changed their views and removed her to their home in the city, where she remained with great satisfaction to herself, and no doubt with equal satisfaction to her friends.

If, then, uncured patients, after their insane disposition and propensities have become developed and well under-

stood, or after a certain degree of improvement has taken place, may often be properly removed from asylums in which they were properly confined in the first instance, as would seem to be the case, it would undoubtedly appear to most persons who are not well acquainted with the characteristics of the insane that all such patients ought to be placed in charge of their nearest relatives, if they have any, as being the persons naturally best fitted to promote their welfare and secure their happiness. This general conclusion would be a mistake, however; and the attempt to carry it into practice would not unfrequently be attended by unnecessary annoyances and failures, and even by positive dangers both to the patient and his relatives—especially to the latter.

The condition and characteristics of many of these patients, and the circumstances and mental status of their relatives, are such, certainly, that they can be placed in care of their kindred without danger or serious inconvenience to either. In all such cases the relatives should be encouraged and, if need be, assisted by the Commonwealth in undertaking the charge.

But there are also many uncured patients who would be improved and rendered happier by a change from asylum to family life, who, for various reasons, ought not to be placed in charge of any of their relatives, and least of all with their immediate family.

As minor, but still in many cases important, considerations on the part of relatives which would render it improper and unwise for them to receive the harmless incurable as a member of their family, may be mentioned: too limited quarters for the accommodation of any additional boarder and lodger; a burden of family cares and annoyances that ought not to be increased; or the fact that there were members of the family—as children, invalids, inebri-

ates, or dementeds—who would be seriously annoyed by or would seriously annoy the patient; or outside annoyances incident to the location in which the family resided, as great confusion and noise, local sources of danger, or the annoyances of ill-dispositioned neighbors. A more important objection still might be found in some instances in the existence of a strong hereditary predisposition to insanity in the family. In such cases, constant contact and intercourse with and the care of an uncured patient, whose actual inherited insanity ran in the same lines as their own inherited predisposition, might be dangerous to the mental stability of other members of the family, and ought not to be undertaken without grave consideration and competent advice. Cases are not wanting in which the danger here pointed out has been found a real one in the event.

There are also, in many cases, reasons on the part of the patient which would render a return to his own home, or relatives, much less advisable than a residence entirely apart from his former home and friends. A return to former scenes and associations, without the ability to undertake the management of affairs, or to exert the influence that had been accorded in a state of health, might act as a cause of irritation, or of depression. Moreover, if restrictions were required, in any way, these would be much better borne from strangers than from relatives who might in former times have been subordinate to the wishes and directions of the patient. Aside from the danger to the family, the return of a patient who entertained antipathies against any of its members would only add to his miseries instead of increasing his happiness.

As a preliminary to the trial of any systematic scheme for relieving harmless lunatics from asylum care and restraints, a law should be passed by the State Legislature authorizing

a system of furloughs, to the end that for a certain period of time patients thus removed might be considered as released on probation, and subject to be returned if the trial should prove a failure. The patient would thus for a time continue subject to all the legal restraints to which he was subject while at the asylum, and, in case of the necessity of a return, legal expenses and delays would be avoided. Some superintendents of asylums even now grant leave of absence on trial, both to uncured patients and to those supposed to be convalescent; and think they are acting within the meaning of the law in so doing. Other superintendents, however, think that furloughs of this sort are unlawful. Hence it would be better if the right were clearly set forth and defined by statute.

The next important step would be the selection of suitable patients for the trial. This should be made by properly constituted authorities after due consultation with and under the advice of the medical superintendent of the asylum.

If the relatives of any patient selected were suitable and willing to undertake his care; and if their home and surroundings were appropriate, the problem of making a suitable disposition of the patient would be already solved. In case the friends were able to support the patient, the State would be the gainer by being relieved of the cost of his future maintenance. If they were unable to give this support, the state would not be the loser by paying to the family an amount equal to the cost of his board and attendance at the asylum.

The suitable disposition of such of these patients as could not be properly cared for by their relatives might offer difficulties of a somewhat serious nature. Whenever this question has been discussed by alienists and others, there have not been wanting those who hold that, in this country,

suitable families could not be found which would undertake the care of such patients for the very moderate remuneration the State would be justified in paying. It is quite likely that at present very many such families could not be readily found. But it is altogether probable that a few might be found in which some of the more orderly incurables from the wards of our large asylums might thus be placed; and if only a very few such families can be found at present, it is quite certain that the number would soon be doubled, and perhaps afterward indefinitely increased, when the nature of the service came to be generally understood. It should be remembered that there are vast numbers of highly respectable families, in comfortable circumstances, throughout the country, who take summer boarders during the busiest season of the year, and at very moderate rates of compensation. It is very probable indeed that some of these families would be even better pleased to receive one or two of these incurables as permanent boarders, and at even a lower rate of compensation. At all events, the trial would cost little either in money or in time, and might be kept within narrow limits until the merits or demerits of the plan had been thoroughly tested. As is well known, this method of providing for the care of harmless cases of insanity has been in practice in Scotland and in Belgium for many years past, and, as is reported, with eminently satisfactory results. It may not be as well known that, in a few instances at least, such patients are kept as boarders in ordinary private families, at the expense of their friends, in this country.

In the first instance such patients only, or for the most part, should be selected for the experiment as were known to be industriously disposed, inasmuch as useful industry is a great promoter of quietude and contentment; and it should be understood by parties who proposed to undertake their

care that they would be expected to encourage the patients in assisting them in their ordinary labors ; that the patients should be their companions in their labors, their recreations, and at their meals. To this end care should be taken that the patients were placed with families suitable to this arrangement. The fact that the boarder was likely to be to some extent helpful, rather than a hindrance, would prove a strong inducement with many to undertake the charge and responsibility.

Of course visitations and inspections by properly constituted authorities would be required ; but these inspections could be made for the most part by local sub-committees, who would report to the central authority having the matter in charge, at stated times.

If this system should prove to be successful, even for a moderate number of patients, it would be of advantage in many ways : to the patients, by securing for them a greater measure of happiness than they could enjoy as companions of a multitude of other sufferers like themselves in any large asylum ; to their companions who remained, as an encouragement to well-doing, in order that they also might at some time be considered worthy of a similar trial ; to the State, by diminishing the expenditure required to construct domiciles for the chronic insane ; and to general practitioners of medicine by inciting them to a more thorough study of the subject of mental diseases, in view of the fact that the insane were being brought more within the sphere of their practice.

A passing mention should also be made, in this connection, of a certain class of uncured but not incurable patients. While it would be highly improper to interfere with the management of curable patients whose improvement has been as great as could be reasonably expected, either by removal or otherwise, until their convalescence

had been established and tested by a sufficiently long probation, there are others of this class of uncured curables for whom a change of domicile and management may be advisable,—that is, patients whose improvement has progressed favorably and satisfactorily for a period of time and has then stopped without apparent cause. In some of these cases a change, either to their homes or elsewhere, seems to initiate a new period of improvement, which may be followed by a speedy and complete recovery.

The following conclusions, then, regarding the detention of patients in asylums for the insane, are believed to be correct, to wit:

1. That, inasmuch as many recoveries take place in asylums for the insane, it is to be expected that some convalescent patients may be at any time found in the wards.

2. That while, possibly, now and then a convalescent patient may be detained on probation an unnecessary period of time, such cases are not of frequent occurrence, nor important in their consequences when they happen; and that, when they do occur, the detention is very rarely indeed through criminal intent.

3. That many harmless incurables are unnecessarily detained in asylums for the insane; that these incurables would be happier in the enjoyment of ordinary family life and associations; and that systematic efforts should be made to secure their enlargement and their establishment under family care.

4. That under certain circumstances curable patients should be removed from asylum restraints and associations while yet uncured.

GALVANIC BATTERIES IN MEDICINE, WITH DESCRIPTION OF A NEW SELECTOR.

BY DRs. JULIUS RUDISCH AND GEORGE W. JACOBY,

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CITY OF NEW YORK.

IT will be necessary before entering upon a description of the selector, which in reality is the object of this communication, for the clearer comprehension of the instrument and its *modus operandi*, to make a few remarks about the proper battery to be employed in the application of galvanism to the human body. So much of the result obtained depends upon the battery itself that we are not at all surprised frequently to hear of negative results only having been obtained in many diseases of the nervous system, in which same disorders we are convinced that galvanism is beneficial. We have also occasionally heard complaints against the injurious effect of electricity in a given case, which statement was all the more surprising, because we have never, when properly applied and with the use of a proper battery, experienced any prejudicial effects from its use. Even Duchenne (of Boulogne), during a very long period of time, insisted upon the uselessness, the dangers, and the painfulness of the galvanic current. Even in the last edition of his work, "De l'Electrisation Localisée," we repeatedly find the idea expressed, that the constant current possesses the very serious fault of producing blisters and eschars. We know well that this ought not and does

never occur when a proper battery is used and proper precautions taken; therefore, why is it that so eminent an authority should have repeatedly made an assertion which is apparently incorrect? It was no error on the part of Duchenne; he really did experience these serious obstacles in the application of galvanism to the human body, and for the simple reason that he used a Bunsen battery for the production of his current,—a battery which at present is entirely discarded in medicine. This fact alone is sufficient to enable us to understand why he had so little confidence in the beneficial effects of this current.

In the selection of a battery there are several cardinal principles which must be borne in mind, and which must not for a moment be lost sight of :

- 1st. The internal resistance.
- 2d. The electromotor force of the cell.
- 3d. The capacity and durability.

These factors are governed by the following rules :

First.—The internal resistance decreases with an increase in the size of the electrodes, and increases with an increase of the distance between them. The internal resistance, also, depends to a great degree upon the specific conductivity of the fluid, for all fluids do not present an equal resistance to the current.

Second.—The electromotor force does not depend upon the size of the electrodes, but upon the materials of which the constituent parts of the battery are composed.

Third.—The durability of a battery depends directly upon its capacity. In general terms, then, the practical conclusion to be drawn from these propositions is: the larger the cell the less will be its internal resistance and the greater its durability. The question of polarization must not be neglected in the choice of a cell.

Many authors, especially the French, speak of the chem-

ical action of a cell—speaking of high or low chemical action—in reference to its effect upon the body. This term is a perplexing one, and one which should be discarded, as the expression “intensity” includes all that may be conveyed by the other term. The intensity of a battery is equal to the quotient of the electromotor force divided by the resistance, or $I = \frac{E.M.F.}{R}$, consequently a cell is more intense in its action the higher the electromotor force, and less intense the lower the resistance. Thus, for instance, if we take the resistance of a Daniell at 20 ohms, the intensity of ten such cells, considering the Daniell as a unit, will be $\frac{10}{20}$ or $\frac{1}{2}$. If, on the other hand, we take 10 bichromate-of-potash cells, freshly charged, the E. M. F. of each will be 2, and the resistance will vary between $\frac{1}{2}$ and 1 ohm, consequently the intensity of the bichromate-of-potash battery will be $\frac{20}{10} = 2$, or forty times as intense as the corresponding Daniell. Thus we see that what others are pleased to call high or low chemical action is nothing more than greater or lesser intensity; and, as it is directly dependent upon the E. M. F. and the resistance, it does not add another complicating factor to our choice of a battery.

It must not, however, be inferred from the above example that the difference between the two cells is so vast when the current from either is passed through the human body, which has a resistance of at least 2,000 ohms. With this modification the first case (Daniell) would read: $\frac{10}{20 \times 2000} = \frac{1}{2000}$, and the second (bichromate): $\frac{20}{10 \times 2000} = \frac{2}{2000}$ or only about as much again. There are so many different kinds of batteries in use that it will be advisable to describe only the five systems which are the most practical, and of those only the one battery which is generally considered the most serviceable for medical use:

(1) Cells with one fluid—Sulphuric-acid battery.

- (2) Cells with two fluids—Daniell battery.
- (3) Cells with the chlorides—Chloride of silver.
- (4) Cells with depolarizing mixtures—Bichromate of potash and sulphuric acid.
- (5) Cells with oxides—Peroxide of manganese.

SULPHURIC ACID BATTERY.

This is the simplest form of a voltaic cell and consists of a plate of copper and a plate of zinc, partially immersed in dilute sulphuric acid, which acts only upon the zinc. The polarization which takes place in these batteries is very strong.

DANIELL BATTERY.

The chemical action in this battery is as follows: The zinc is dissolved, forming sulphate of zinc, and the hydrogen which is developed is replaced by an equivalent amount of copper, which is deposited upon the copper electrode. The surface of the electrode being thus preserved intact, and no change occurring, no process of polarization can take place. To be concise, the addition of the sulphate of copper is sufficient for the depolarization of the negative electrode. As a direct consequence of this non-polarization, we would be justified in expecting to find the electromotor force of this battery an unchangeable one, and, indeed, experience proves that it is a battery of great constancy. This cell, by virtue of its constancy, has been accepted as a standard for comparison. The British Association has, however, accepted a "Volt" as their standard, which differs very little from that of a Daniell.

Change of temperature seems to have but very little influence upon the constancy of this battery. (Sabine.)

It changes very little with an increase or decrease of acid concentration. (Lattimer Clark, Sabine.)

It undergoes only very little change with a variation in the quantity of blue vitrol. (Jul. Regnault.)

Thus, considering all the above facts, we see that the electromotor force is almost constant. Nevertheless, experiments show that the intensity of the current is continually undergoing variations. The electromotor force being constant, as shown above, this change can only be due to a variation of resistance; and such is the fact. For various reasons the resistance is continually changing. There are very many modifications of this cell, but as they all possess pretty much the same characteristics it is unnecessary to further describe them.

BATTERIES WITH THE CHLORIDES.

Of this class the best one for medical use is the chloride-of-silver cell. In this the chemical action which takes place is the following: The zinc is dissolved and takes the place of the silver in the chloride. The silver is deposited in the form of a porous mass; at first only upon the surface, and then gradually permeating the entire substance. This battery presents one very great advantage—the same as that presented by batteries in which the chloride of ammonium is used—which is that as long as the circuit is not closed, there is no action upon the constituent parts of the battery.

CELLS WITH DEPOLARIZING MIXTURES.

Cells with bichromate of potassium and sulphuric acid.

These cells have a very high electromotor force, which is equal to 2.028 (Clark and Sabine)—double that of a Daniell.

This high electromotor force, however, only exists when they are first used, for the reason that the cells become polarized very rapidly, because the depolarizing mixture acts well only while it is fresh, and the substances, acting upon themselves even when the battery is not in use, soon lose their depolarizing action. These batteries, we know from a large experience with them, require constant care and supervision. Their constancy is continually under-

going variations, which, however, are not due to any appreciable diminution of the electromotor force, but to a very material increase in their resistance.

CELLS WITH THE OXIDES.

Peroxide of Manganese—Léclanché.

The chemical action which takes place in this battery is as follows: The zinc forms a combination with the chlorine of the chloride of ammonium, and forms chloride of zinc, and the ammonium is liberated. The freed hydrogen, which without the presence of the peroxide of manganese would polarize the carbon, is oxidized to water; the peroxide is reduced to sesquioxide of manganese, the ammonium is dissolved in the water and enters into a combination with the chloride of zinc. The advantages of this battery are the following:

(1) The zinc is not attacked by the ammonium salt, and therefore no action takes place when the circuit is open; or, to put it in other words, when no current is produced no consumption of material takes place. There can, therefore, as far as this point is concerned, be no question as to the superiority of this battery over the gravity.

(2) Owing to the depolarizing action of the peroxide of manganese the electromotor force of these cells is very high. It has been placed by Léclanché himself at 1.38, a Daniell taken as 1.00, but other authorities place the figures higher still, at 1.60 or more.

(3) The cell has a comparatively low resistance, which is due to the excellent conductive power of all the materials used in its construction and to the very large surface of the electrode. Cells having a porous cup of fourteen cm. in height have a resistance of $5\frac{1}{2}$ –6 ohms. In cells of equal calibre the resistance of a Léclanché is less than that of a Daniell.

(4) The cell does not contain any poisonous materials and does not generate any fumes or noticeable odor. There are several practical points in the use of this battery which materially aid its action and tend to preserve it from waste. They are: Keep the zincs well amalgamated, so that no irregularities or porosities appear upon its surface. Use pure sal ammoniac. Use a saturated solution. Only fill with fluid to one half the height of the porous cup. Never allow the battery to remain closed upon a short circuit. The depolarization which is produced by the peroxide of manganese is not complete when the external resistance is a small one, and consequently the electromotor force sinks very rapidly under this condition. It is a fact, and one which has been raised strenuously against the employment of this battery, that if the battery is closed upon a short circuit, a few minutes are sufficient to completely polarize it. This objection to its use is, however, not a valid one; for, firstly, the battery was not designed for use on a short circuit, and using it thus is endeavoring to make it subservient to ends for which it was never intended; secondly, if the current is interrupted it quickly regains its former strength. It recuperates very rapidly under repose. This is the question of polarization in all its simplicity. This battery requires no attention for a long period of time. We have had these cells in use for over a year without giving them the slightest attention; at the end of that time it was, perhaps, necessary to add some water, in order to replace the amount which had been lost through evaporation, or, if the battery had been excessively used, to replace some of the zincs. With these slight exceptions we have not been obliged to have any thing done to the battery for upward of three years, and this under daily usage and for protracted periods of time. It would here not be out of place to impress upon our readers the fact that such satisfactory service can only

be obtained by proper care, or, to express ourselves more correctly, by an absence of improper care. Meddlesome interferences should be entirely avoided, and no person except one accustomed to its care should attempt to repair a disordered battery. We have frequently seen inexperienced operators shake the battery, with the idea of thereby increasing its strength, when told by the patients that they did not feel the current. That this is an error, and certainly prejudicial to the battery, we need not insist upon.

The Lécianché battery has also been arranged in a portable form, as follows: A test-tube, having a platinum wire which reaches to one third the height of the tube embedded in the bottom, is filled to this same height with granular peroxide and carbon, and upon this is poured a saturated solution of chloride of ammonium. An amalgamated stick of zinc, passing through a rubber stopper which closes the tube, forms the other electrode.

The objection to these small cells is that their capacity being reduced to a minimum, they are very easily and quickly exhausted, and must then be refilled, which is a somewhat troublesome operation.

In general terms, then, the choice of a battery for the application of the continuous current should be governed only by the source whence the electricity is obtained, all other questions of portability, appearance, etc., are only secondary questions and subsidiary to it. In ordinary cases of peripheral disease of the nervous system this necessity is not so great and almost any battery will do, but for central lesions and in the more delicate operations on the head, eye, or ear, or, in brief, where the regularity of the current is of supreme importance, it is an absolute necessity to have a battery of—

- I. Low intensity.

2. Great constancy.

As regards the inconveniences of too great intensity they are the following: The sensation of burning and the disorganization of the skin are produced very rapidly. The currents generated by such batteries are always more or less irritating and produce general excitation. On this account the cells which contain the bichromate mixture are not commendable. Furthermore, when a current from such a battery is applied to the head, the change from cell to cell is a decided one and may become dangerous. For instance:

$$I = \frac{E.M.F.}{R} \quad \frac{E.M.F.}{R} \text{ of a Léclanché} = \frac{1.5}{5} = \frac{1.5}{5} = \frac{1}{3} \text{ I.}$$

$$\frac{E.M.F.}{R} \text{ of a bichromate} = \frac{3}{1} = 3 \text{ I.}$$

i. e., the intensity of a bichromate of potash cell is six times as high as that of a Léclanché.

The current, when the external resistance is low, and this is always reduced by the prolonged passage of the current, is much more felt; especially is this the case in a freshly charged bichromate cell, and also to a lesser degree in a freshly charged Léclanché. At the same time the amount of electricity passed is very small. This point is one of importance, because batteries are frequently selected precisely for this quality we now condemn. This selection is made with the idea that the thermic action of the battery upon the skin is a gauge of the quantity of electricity generated. This question of intensity, in our estimation, far outweighs all questions of constancy, and if we have our choice between two batteries, the one of great intensity and great constancy, and the other of low intensity and great inconstancy, we would under all circumstances prefer the latter.

This selection would, however, also be influenced by the well-known fact in physics, that the slower the decomposition in a cell takes place the more perfect is the arrest of

polarization, and therefore the greater the constancy. The process of decomposition can be easily retarded by placing a very high resistance in the circuit, and thus when a current from a comparatively inconstant battery is passed through the human body, the resistance of which is very high, varying from 1,500 to 10,000 ohms, the battery becomes for the time being practically constant. It is probably in consideration of this fact that many eminent authorities, and among them Erb, use a battery which is in itself an inconstant one.

To sum up, then, if a portable battery is desired, the chloride of silver is the one that we would recommend, its only objection being its high cost. The bichromate-of-potash battery should be classed as ranking last in the scale of commendable batteries. The ordinary gravity batteries and the Léclanché are the only two batteries that we can unhesitatingly recommend. They are, however, necessarily stationary. The Daniell is, as we before remarked, very constant, and is from all theoretical points of view the nearest approach to a perfect battery, but its bulk is so great and the constant care which it requires is such that none but a specialist can devote the necessary attention for its proper maintenance. In view of this we consider it practically inferior to the Léclanché battery, for, as has been shown above, the inconstancy of the latter does not come into action. We have now used the Léclanché cells for a number of years and have been in every way satisfied with them; the only trouble that we have experienced during their use was owing to the fact of the first few cells of the battery becoming used up much sooner than those further on in the series. This, however, was not due to any fault in the battery but to the imperfection of the current selectors now in use. For this reason we have devised a selector which has now been in use on several batteries for over

a year, and which leaves nothing to be desired as regards its practical utility.

The selector, or, as Zech calls it, the "element counter," is an apparatus which is generally considered essential to the proper application of galvanism in medicine. By means of this instrument we are enabled to bring into action any number of cells from first to last, and therefore can increase or diminish the strength of the current as necessity may require. A perfect selector should allow of the gradual increase or decrease in the strength of the passing current without producing any interruption of its steady flow. It should make an absolutely close connection of the voltaic chain, and finally should permit of a selection of the cells from any part of the circuit—commencement, middle, or end. In order to be able to clearly comprehend the advantages which our selector possesses, it will be necessary to briefly describe the principles upon which those act which are now in use. They are constructed according to one of three models—the crank, the rider, and the plug, systems. The selector which has, until now, been considered the most practical, is that described by Remak. It consists of a plate of hard rubber, upon which are arranged in a circle or semicircle the metallic buttons through which the connection is made. A metal crank, pivoting at the centre of the circle, can be brought into contact with each of the buttons successively, thus allowing a current of more or less intensity to pass according to the button upon which it rests.

By this means we are obliged to take the buttons with their corresponding cells in rotation, beginning at the first. The result of this is, that the first cells, by constant usage, become rapidly weakened, while the last ones remain almost unused. Thus is produced an irregularity of the current which is very unpleasant and may, under circum-

stances, become injurious. This objection has been obviated by Gaiffe. His selector is, however, too complicated to be described in this connection. It also presents one objection, which all the selectors of the crank variety do,—namely, that the connection between crank and button is very apt to become loosened, and thus a break in the current liable to occur.

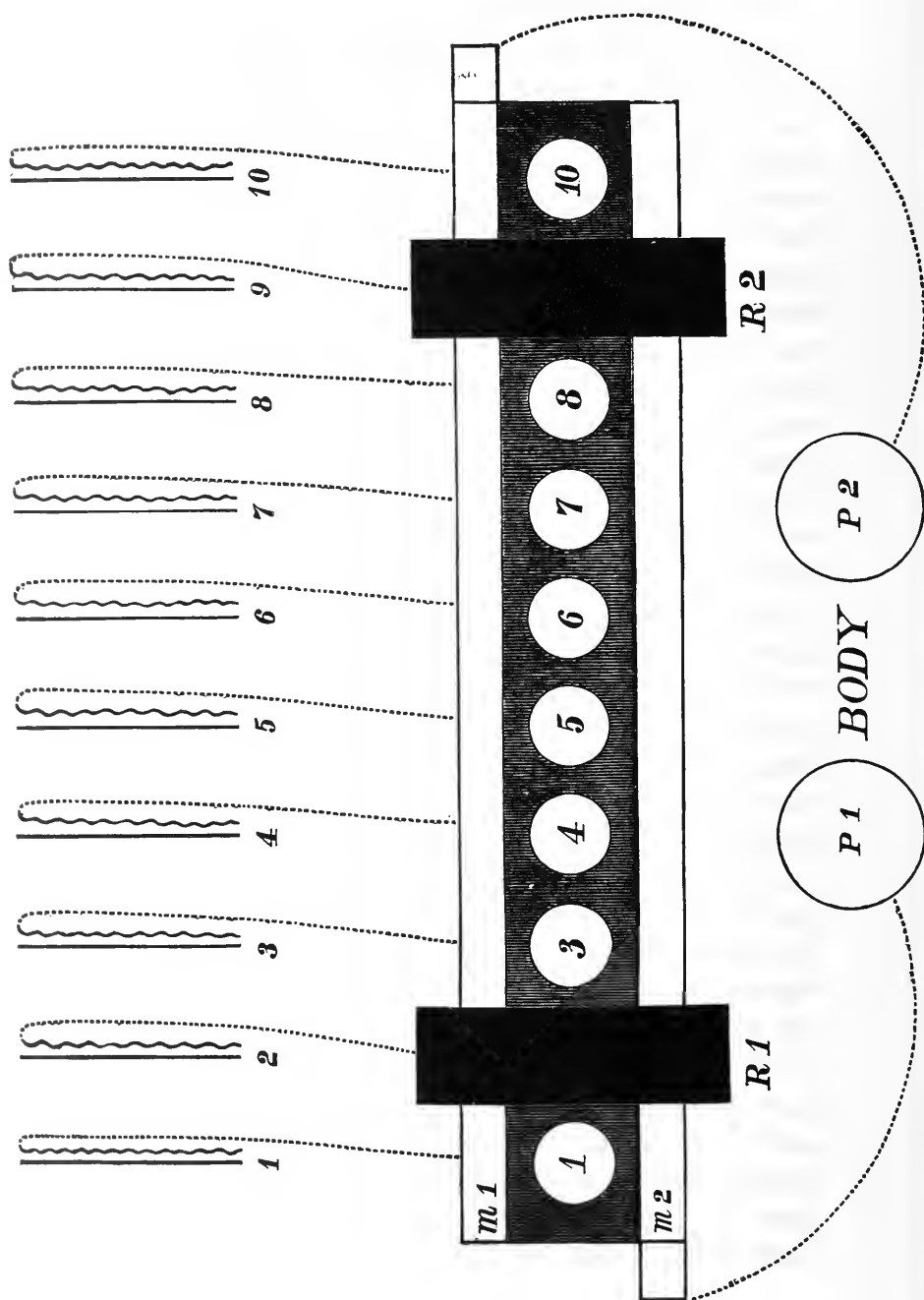
The second class of selectors are those known as the plug or “Brenner’s” selector. This differs from the crank selector inasmuch as, instead of buttons and a crank, brass plates and plugs are used. Each metallic plate has a semi-circular piece cut out at either end, so that, when the ends of two different plates are approximated, a circle is formed, into which the metallic plug fits tightly. This plug selector is very rarely used now ; its disadvantages are apparent.

The third class of selector may fairly be represented by that of Stöhrer. It consists of a rectangular strip (table) placed horizontally upon a base. Along both edges of the former are fastened, at regular intervals, plates of brass which correspond to a certain number of cells. A metallic rider is placed over the median portion and is movable between the two rows of plates forming a metallic contact with them. If the rider is placed at O, no current passes ; if at the point 2, two cells are brought into action, and thus, the farther the rider is removed from O, the stronger the current. These last two systems have the same disadvantage as the first,—that of using up the first cells before the rest. By means of the rider system, cells cannot be introduced singly but only in pairs.

The selector¹ to which we hereby desire to attract attention is a combination of all three systems, at the same time partaking more of the characteristics of the rider variety. Upon the base of the battery is attached a strip of hard

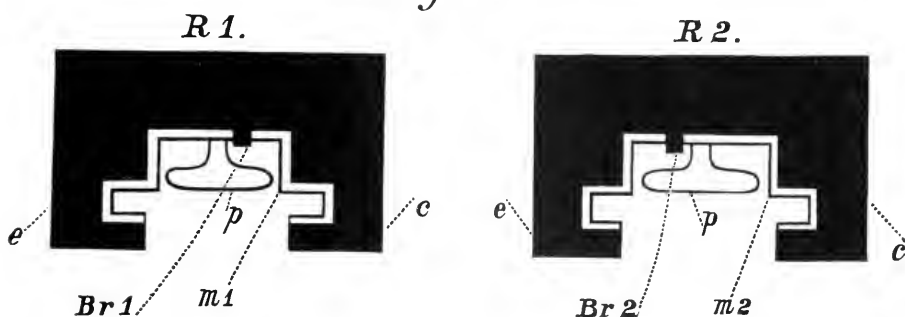
¹ This selector is manufactured by W. Weihl, model-maker, 332 Seventh Avenue.

rubber, which is surmounted by as many buttons as there are cells in the battery (see illustration for ten cells). Two strips of metal run along the sides of the rubber strip from end to end (fig. 1, *m* 1, *m* 2). Two riders easily movable toward either end surmount this (fig. 1, R 1, R 2). These riders consist of a hard-rubber body, which serves as a handle, to the bottom of which is attached, by means of a strong spring, a metallic plate, once and a half as large as a button (fig. 2, *p*, *p*). The whole rider is kept in place by two side pieces, best described as clamps (fig. 2, *c*, *c*, *c*, *c*), which are in close connection with the metallic strips *m* 1, *m* 2, fig. 1. This entire rider is lined by a thin plate of metal, so that a direct metallic connection is formed between it and the metallic strips (fig. 1, *m* 1, *m* 2). The metal lining of the upper clamp of the left-hand rider is broken (fig. 2, *br* 1) the lower clamp of the right-hand rider is also broken (fig. 2, *br* 2). The connections then are as follows: The lower metallic strip (fig. 1, *m* 2) is connected to the binding-post on the left hand. The upper metallic strip (fig. 1, *m* 1) is connected to the right-hand binding-post. The zincs of each cell are connected to the buttons with corresponding numbers. The cells are connected among themselves in series, the zinc of No. 1 to the carbon of No. 2, etc. Upon whichever buttons the riders may be placed, all the cells contained between them are brought into action, and the cells lying exteriorly of either rider are thrown out. The following example will make this clear, and plainly demonstrate the *modus operandi* of the selector. If the rider R 1 is placed upon button 2, and rider R 2 upon button 9, we will have seven cells in action, and the current passes from the second cell to the second button, from this button into the first rider (R 1), which is placed upon it. The connection of the rider with the upper metallic strip being broken, it goes to the lower metallic



strip, and thence through the connecting wire to the binding-post (P 1). From there it passes through the body connecting the two posts to the second binding-post (P 2), through the wire to the upper metallic strip, along this to

Fig. 2



rider 2, and then into button 9, upon which it rests, through the wire to the battery, thus completing the circuit. The advantages which we claim for this selector are:

1st. There is always a firm connection between the buttons and the riders. This being accomplished by means of a spring, the button is forced down upon the button of the selector from above.

2d. The cells can be introduced into the circuit one by one, and not as in other instruments of the rider variety, only in pairs.

3d. The first cells of the battery do not become worn before the others. Whatever may be the position of the riders, the only cells comprised in the circuit are those situated between the two riders, and all cells situated this side of the first rider, or the other side of the second rider, form series of isolated cells.

4th. It is very simple by means of this selector to detect any break that may have occurred; for if the riders are approximated and moved along the selector, the cells are taken singly and in rotation, and the galvanometer will at once indicate the site of the break.

SYPHILITIC PARESIS.

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SYPHILITIC paresis is seldom recognized by the profession as a separate disease, but is classed among the rheumatoid affections; and although it simulates rheumatism in various ways, it is a distinct disease of itself.

CASE I was twenty-seven years of age, white; born in New York State, and of Irish parentage. He came under my care on the 18th of January, 1879, suffering with stiffness in all his joints. He was a silver-plater by trade, and like most young men of his class, was intemperate, and had acquired syphilis a few years before.

With a history somewhat like the above, he had entered Western Pennsylvania Hospital (twelfth ward division) about three months previous to the above date, and was placed on the anti-syphilitic treatment, consisting of potass., iodid., and hydrarg. chlorid. cor. in solution. But he grew worse rather than better, and was finally discharged as incurable. For the rheumatic trouble which he was supposed to be suffering from later in the disease, he had been treated with acid salicylicum. When first seen by me his tongue was pale; pulse 88, full and strong; bowels regular; appetite bad; temperature normal ($98\frac{1}{2}^{\circ}$), urine high-colored and scant; had pains in his arms and legs while standing or moving about, but sitting upon the chair or lying upon the bed he was somewhat at ease. When he attempted to walk he had power to move his feet only two inches apart, either forward, backward, or sidewise. His legs and arms were stiff and painful, but the arms not to so great an extent as

the legs, and he had a tenderness on pressure in the inferior dorsal region about the neighborhood of the twelfth dorsal and first lumbar vertebræ.

Following the treatment laid down for such cases (especially when acidum salicylicum had failed), I gave him the same treatment he had been given formerly, namely : potass. iodid. and hydrarg. chlorid. cor., adding in connection a small (two by four) emplastrum cantharidis on the tenderness upon the back, which relieved so long as the surface remained broken. I persisted in this treatment for about a month, with little or no good results. I then re-studied the case.

He had been cured of his syphilitic trouble with mercury. The syphilis had never troubled him after treatment. He took cold about four months previous to my seeing him, and was supposed to be suffering from the fumes arising from melting silver while at work. I discovered by closer observation that the spinal cord was affected, and that the syphilis played a prominent part in his trouble. With this new discovery I discarded the treatment I had expected so much from, and placed him on oleum morrhuæ. As his blood was in an anæmic condition, I gave him, in addition to the oil, tinct. ferri perchloridi.

The effect was magical. Three months after this change of treatment I had him moving about the dining-room assisting the man who had charge of the wards. His limbs, however, did not resume their suppleness for fully another quarter, at the end of which time I appointed him ward-master, and he remained with me for a year afterward, when I was able to pronounce it a complete cure.

It would be asked why oleum morrhuæ had so great an effect upon this case when potass. iodid. failed. I attribute it to the iodine which is found pure in the oil. The disease had become a nervous affection. Mercury and syphilis had made their attack upon the spinal cord (dorsal and lumbar region), retarding the circulation of the nervous fluid along the great sciatic nerve, more especially the supply to the peripheral nerves. The iodine in the oil took up the deleterious matter and removed it ; at the same time the fatty constituents improved his constitution.

CASE 2 was twenty-four years of age, white, female ; born in

Missouri, and of Irish parentage. She first came under my care on the 19th of March, 1880, suffering with active syphilis. She had a bubo on left side and a purulent discharge from vagina; a hard chancre upon labia majora; her system was exhausted; had a slight fever, and her appetite was not the best. Under treatment she soon recovered and left the hospital on the 19th of April, 1880.

She enjoyed good health after this for about a year and a quarter, when she came back in a worse condition, entering the hospital,¹ the second time, on the 12th of August, 1881. She was a courtesan, and partook of the wild life incident upon girls of that character. Having caught cold a few days previous, from exposure, the old complaint came back in a worse form. She had severe pain in her arms, lower limbs, and shoulders, pain in right side; tongue furred and coated; pulse 86, full and weak; appetite moderate, with a feeling of nausea; bowels regular; and temperature 100° F. She had large copper-colored spots over the whole of the body, which was the only sign of syphilis present. She suffered from insomnia, and had stiffness of the arm, forearm, and shoulder.

Having her under treatment before and knowing her former history, I gave her large doses of potass. iodid. The second night after she began this treatment she gained some rest, and on the third the pain had subsided, and the sixth found the stiffness entirely removed, and she left the Home about the 12th of September entirely well.

Iodine in its favorite combination was administered in this case with good results. The disease had just begun to show the secondary manifestations, is one reason I attribute why the drug acted so promptly.

CASE 3 was twenty-six years of age, white, male; born in Ireland, and of Irish parentage; came under my care on the 6th of October, 1881. He had been suffering for six days with pains and stiffness about the lower limbs.

He had syphilis two years before, and was cured of the trouble with the usual drugs. Had a severe pain in the left hip; irregular action of the heart; tongue pale and coated white; bowels costive: appetite poor; pulse 80 and irregular, and temperature

¹ Pittsburg City Home Hospital.

99 $\frac{1}{4}$ ° F. Recognizing the syphilitic diathesis I gave him potass. iodid. and hydrarg. bichlorid. in solution.

October the 12th found him, if any, but slightly improved. He had a bad night, with the pain in the hip, which was not so severe during the day as it was during the night; his hearing was also affected; tongue furred, but not so coated as before; appetite bad; bowels regular; temperature 99 $\frac{1}{4}$ ° F.; pulse 60, full and strong; urine high-colored and free; his skin was sallow but moist; he had a lightness in the head, a wild look about the eyes, and his mind wandered during the night. Although he did not show that marked improvement he should have done, still I continued the above treatment.

October 16th he was very little, if any, improved. The pain about the hip still troubled him, although with not that severity it had formerly; his eyes were slightly congested; tongue furred and coated; bowels regular; appetite better; urine high-colored and free; temperature 99 $\frac{1}{4}$ ° F.; and pulse 59, full and strong. Although the pain was not so severe, yet the parts were very tender, and he was unable to move his limb or walk about. Still I continued the treatment.

October 23d he was slightly better, but not so marked as I had expected. The pain had increased in severity during the night and lasted until six o'clock this morning;¹ his eyes were still congested; tongue coated and fringed with purple; pulse 65, full and strong; appetite fair; hearing, if any change, duller; face flushed; his head still felt light, attended with a pain along the frontal sinuses; bowels regular; and temperature 99 $\frac{1}{4}$ ° F. He was still almost bedridden, and it was with great difficulty he moved from his bed to the water-closet, which was in an adjoining room, about one hundred feet from him. I now took him off the hydrarg. iodid. and placed him on simple tinct. iodine giving two-drop doses repeated often. In connection with this, I gave him a vegetable purgative to relieve a congestion of the brain with which he was threatened.

Nov. 1st the pain in the hip was not so severe, except at such times as he attempted to move about, when it attacked him with severity. The appetite was good; urine free; pulse, 56, full and strong; temperature, 99 $\frac{1}{2}$ ° F.; tongue slightly coated; and face flushed moderately. He had been lying in a reclining position for

¹ It had been cool all night. The steam in the heaters was not sufficient to keep the room above 45° F., but about 5.30 A.M. the boilers were fired up and the temperature arose to 80° F.

the last few days with very little pain and no excitement, and presenting a sort of vacuity in his countenance. The iodine treatment was continued with an emplastrum cantharidis upon the spine about the inferior dorsal region.

November 7th, he was much improved, and with the exception of a slight frontal cephalalgia (which annoyed him) he was free from pain. The tongue was still coated and furred ; appetite was good ; bowels regular ; urine high-colored and scant ; pulse, 70, full and strong ; heart's impulse strong ; temperature 100° F. ; face flushed ; and pupils dilated. The hip was sore, but not so painful except at times he attempted to exercise it, and was sore about the abdomen. Although the pain was felt only about the hip, yet all his joints were more or less stiff, and the brain was congested, causing that slow action of the heart which is noticed above. There was no evidence of swelling about any of the joints that could indicate inflammatory trouble, I therefore continued my treatment of the "tincture of iodine."

His recovery from this time forward was rapid, and he was discharged on the 19th of December, 1881, being in the hospital two months and twelve days under treatment.

The symptoms of this case simulate morbus coxarius so much I do not feel like departing from it without saying a few words on that disease.

That it was not morbus coxarius, the termination of the case confirmed. The pain, which was intense, was not the pain of that disease. Although it was constant, yet handling did not increase it. The temperature was not increased. There were no signs of swelling about the hip much less about any of the other joints ; and although the rotation of the thigh was severe, yet it did not produce that intense feeling which is experienced in inflammations of the synovial covering of the acetabulum ; and further there was neither lengthening nor shortening ; nor was there that contraction of the muscles which follow a protracted inflammation of that membrane. No tenderness on pressure except upon the spine, and it seemed to be an irritation rather than an inflammation of the great sciatic nerve at its exit from the

pelvis ; besides these points there was a stiffness of all the joints without an increase of heat or swelling. The syphilitic diathesis also aided me in my diagnosis.

CASE 4 was a male, white, thirty-four years of age ; born in Ireland and of Irish parentage ; came under my care on the 15th of October, 1881.

He had acquired syphilis two years before, and was (as he thought) cured completely. About forty-nine days before entering the hospital, he took sick with pains in the back (inferior dorsal region) and limbs, and was unable to lift the left arm and leg. He had an idiotic look and rambling talk. His bowels were regular ; appetite good ; temperature $99\frac{1}{4}^{\circ}$ F.; pulse 90, full and strong ; urine free ; and tongue coated white. He had also a cataract in left eye. The pain in the back was so severe, and the joints so stiff, he was unable to move about or change his position. Recognizing the syphilitic nature of the disease, I prescribed potass, iodid., and hydrargyri bichlorid. in solution.

October 23d he was better ; tongue red and furred ; appetite good ; bowels regular ; urine free ; temperature $99\frac{1}{4}^{\circ}$ F.; and pulse 80., full and strong. He had now been eight days under the iodine treatment, and the improvement was so marked, I continued it. He was able to move to and fro from his bed, lift his arm above his head, flex his legs full, and shut his hand without any difficulty. The pain in the back lingered, giving him some trouble at night, so that I increased the dose, giving him as high as sixty grains of potass. iodide, and half a grain of hydrargyri bichlorid., in twenty-four hours.

November 1st found him so far improved as to be able to move about without suffering much from the pains in his arms and legs, that still annoyed him. The tongue was slightly coated ; bowels were regular ; appetite good ; urine free but scant ; pulse 86, full and strong ; and temperature $99\frac{1}{2}^{\circ}$ F. His skin was dry, and his countenance had a cast of anguish about it. I thought he must be suffering more than he would acknowledge. But he did not complain, and I continued giving him the potass. iodid. and hydrarg. treatment, though at the rate of forty grains of the potassium salt to one-fourth grain of the hydrargyrum in twenty-four hours.

November 3d he left the institution against my wishes. He was so free from pain, however, that he expected to go to work as

soon as he reached the city, having heard of a place from one of the inmates before leaving.

CASE 5 was a male, white, forty-three years of age; born in Germany, and of German parentage. He had acquired syphilis several years before, and was cured by the usual treatment *versus* iodine and mercury. Came under my care on the 30th of December, 1881. Took sick about four months before with stiffness of the arms and legs attended with severe pain. He received no treatment all this time, and was allowed to suffer until the cerebral centres were attacked, when he was brought to the Home hospital. His temperature stood 102° F., indicating an inflammatory trouble; his pulse 94, but full and strong; tongue pale and fringed with red; appetite poor; bowels loose; and he passed his urine freely. His mind was weak, and when he attempted to move about he staggered; was incoherent in his speech, and upon the whole presented a melancholic aspect. He also complained of a frontal cephalalgia, and had a catarrhal cough. Following the regular line of treatment, I placed him on potass. iodid., etc.

January 1, 1882, his condition was worse. The temperature had risen to $103\frac{3}{4}^{\circ}$ F.; the pulse 96, full but feeble; bowels costive; tongue coated and moist; appetite still remained poor; urine passed freely; his speech was incoherent; he staggered in his gait, and he had to have a person with him constantly attending to him.

Recognizing the debilitated condition into which he had sunk, I placed him on a ferruginous and stimulant treatment, discarding the potass. iodid. I did not, however, obtain any good results from the change of treatment, but he sank gradually into a lethargic state, and died on the 9th of January, 1882.

The autopsy was held twenty-four hours after death. The dura mater, external or fibrinous layer, was extensively congested. Adhesion of the fibrinous and serous layers near the frontal sinuses, left side. Granulations of inflammation on the internal surface of internal or serous layer, and on the arachnoid covering in both hemispheres about the region of the supralongitudinal sinus; subarachnoid space distended with a serous fluid, and the plexus of pia mater somewhat congested. The other parts of the brain appeared to be healthy.

The medulla oblongata was slightly congested, which I supposed was partly from the action of gravitation.

The cervical cord was the only part of the spine examined, and it was very much softened. Dissolution had set in, and I deemed it of no use to obtain sections of it.

Syphilis has long been known as a most destructive disease, leaving its impress upon the system long after the virus has been apparently destroyed. It is to the present age what leprosy was to the Jews, being a curse to the party who has acquired it. There are few who can flatter themselves that they are ever free from it, the inertia of the germ being no proof of its destruction. For although it may be latent in the person who acquired it, yet it is transmissible to the offspring. In the study of the disease this hereditary diathesis must not be overlooked. We must not limit ourselves to individual acquirement. It has, however, generally been looked upon as a dissecting disease ulcerating the body and destroying life by its exhaustion of the nervous system.

Exclusively as a nervous disease it has been only the last few years we find articles of any moment upon it. Dr. Maudsley says:¹ "The syphilitic virus usually affects the nervous system more or less severely at one period or another of its action; but in some instances it appears to attack the nervous system specially." This is evident in all constitutional cases, for while the system at first is strong enough to cast it off by an eruption upon the body, yet in the end it develops into a paretic condition of the whole surface. This action will take place sooner if an attempt is made to heal this eruption by external applications. Again we have ulcers in cases of old syphilis, which fail to heal after a great deal of trouble. This condition (which is chronic) is on account of the functional disturbance of the peripheral nerves. The above author² relates a case of acute mania which developed just at or soon after the secondary manifestations of the disease had shown themselves.

I had a case which illustrates this action upon the cere-

¹ "Pathology of the Mind," page 200.

² "Pathology of the Mind," page 482.

bral forces equally as well as Dr. Maudsley's ; and will therefore relate it instead of his.

He was a man, white, about forty-two years of age ; born in Pennsylvania, and of respectable parentage ; when quite young he was addicted to the use of spirituous liquors, and was also a frequent visitor to houses of ill repute. On one of these visits he acquired syphilis, it being several years before ; and he claimed to have been cured, but I believe the intemperate habit would have rendered inert any medicine he would take.

When I saw him first it was after a protracted spree ; and after the clerk had taken his record, and before going to the hospital,¹ he took an epileptiform convulsion, which I claim was superinduced by alcohol. The syphilitic diathesis was visible in large ulcers upon the lower limbs, and a syphilomatous condition of the skin.

In the several months he was with me he never took another convulsion, but gradually improved in health and appearance ; and like most of his kind wandered between the Home and city. Thus I had him several times in the hospital, and the last time I endeavored to heal the ulcers upon his lower limbs ; and although they healed nicely, yet it developed acute mania. One day just before supper I was called into the male ward to quell a riot which had broken out among the inmates. There I found them excited at an act this individual had committed. He had apparently for no cause struck and seriously injured an inoffensive boy ; and when questioned about it, he gave an incoherent reply. Finding him delirious, I deemed it the safest to confine him in the asylum.

After five months' discipline in this department, he was discharged as cured. And he had not been in the city more than five or six weeks when he fell in one of the above convulsions and expired. There was no post-mortem, but from the description of his death I supposed it was from cerebral congestion.

The pathology of the disease is obscure, inasmuch as cases of syphilitic paresis generally recover. To study it properly you must examine cases of general progressive paresis where the syphilitic diathesis plays a prominent part. It is, if not an original cause, a fatal adjuvant to the predominant cause, being one of the principal excitants to that

¹ City Home Hospital, Pittsburg, Pa.

extensive sclerosis of the spinal cord we discover in long-continued cases of this kind. I might, if permitted, say it appears upon the cord much in the same way a hard chancre appears upon the glans penis.

Syphilitic paresis is not an organic but a functional disturbance, and the virus seems to have its greatest affinity for the cervical cord after it once enters the system, especially the lateral or postero-lateral columns. It then gradually moves downward, affecting the spinal nervous system completely and finally upward upon the cerebral centres.

When the spinal trouble manifests itself we then have the beginning of paresis. Unfortunately, however, for the profession, we seldom gain a case until the cerebral symptoms have occurred. The attack upon the vaso-motor centres brings to notice the spinal trouble.

Dr. H. C. Wood¹ relates several cases in which he gained post-mortems which will aid us partially in obtaining a correct idea of the anatomical changes that occur in these cases. I believe later in the disease, that is, when it has passed into a general paralytic condition, the whole cord as well as the cerebral centres are involved in the general degeneration.²

Dr. Wood considers there is less known of syphilis of the spine. This is undoubtedly on account of the above assertion, "that the attack upon the vaso-motor centres brings to notice the spinal trouble." I believe cerebral syphilis is a continuation of the spinal disease. Nor could I think as he does that the spinal syphilis is more serious than the cerebral affection, for in the treatment of the case we have the assistance of the patient in spinal disease, while in the cerebral we do not (the patient being unconscious of his action).

¹ *American Journal of Medical Science*, vol. 80.

² I had several cases of general paresis and all but one had the syphilitic diathesis.

The doctor's case 7 followed much the same course that my cases did, only to a greater extent. In the autopsy he found the following points: The lateral and posterior columns were sclerotic, more especially in the dorsal and cervical cord, and the endoneurium of the posterior roots much proliferated and infiltrated with embryonic pus-cells. The case had passed from a purely functional to an organic disease.

The symptoms of this disease are: slight elevation of the temperature, and severe pain. This pain is constant, its severity being affected only by the rise and fall of the temperature of the room. It is present with stiffness and soreness of all the joints affected, attended with no increased heat or swelling. The sensory filaments seem to retain a partial use of their function, while the motor track, though not entirely obstructed, is, to a greater extent than the sensory. Very little of the body is exempt, the mind at times being affected almost to delirium. This, however, is caused only when the vaso-motor centres are involved. There is a general languor, and the patient is much irritated on being disturbed. The pulse is generally full and strong; heart's impulse strong, especially if there is much cerebral congestion; there is very little or no pyrexia; bowels are generally costive, not so much on their own account as from the pressure of the cerebral forces; urine is generally high-colored and scant. The appetite is affected according to the severity of the pain; the stomach being disturbed through sympathy. The eyes and conjunctiva are affected from the pressure upon the brain. The skin is dry and sallow, and there is generally a tenderness along the spine.

The diagnosis is somewhat difficult, inasmuch as the pain simulates the pain of several complaints—both inflammatory and neuralgic. An early diagnosis is important,

however, on account of it giving the most favorable results, for out of five cases which I have quoted, I had four recoveries.

Articular rheumatism, an inflammatory disease, is attended with hot, painful, and, later in the disease, swollen joints. The parts are tender, the pain trophic, and there is a general febrile condition.

In synovitis, also an inflammatory disease, the pain, as well as the disease, is trophic, and is attended with swollen, hot, and painful joints. There is no pyrexia except through sympathy later in the disease.

Osteitis, another inflammatory disease, is like synovitis, though it is not confined to the joints, but more often in the shaft.

In myalgia the pain is trophic and constant, but not attended with painful joints. It is located in the terminal filaments of the nerves and is increased by active contraction of the muscles.

In neuralgia the pain is paroxysmal, shooting, lancinating, darting, boring, etc., and is referred along the line of the nerves. It is not constant. If it is from malarial poison, it is periodical. The paroxysm develops spontaneously, or in consequence of some trifling cause not at all commensurate with the severity of the pain produced. A poor condition of a patient's blood, which is almost general, is also a point in diagnosis.

In syphilitic paresis the joints are stiff, not swollen; pain at times trophic but obscure, constant, but the severity of it is regulated by the fall and rise of the temperature of the room. There are also later in the disease vaso-motor disorder, atrophic in character, and congestion of the brain.

The prognosis is favorable at the beginning of the trouble,—that is, before organic trouble commences, and it becomes worse as the patient sinks from a state of irritability into that

of delirium. It is not, however, hopeless until inflammation sets in, or gummatous tumor develops. Even then the case, under proper treatment, can be prolonged. The patient generally dies of nervous exhaustion.

In the treatment of this disease I believe iodine is the *sine qua non*. It will, however, depend on the idiosyncrasia of the patient and the amount and kind of medicine that has been before taken, whether iodine in combination with potassium, or in some other form, will be the best way to administer it. If the patient can stand the nauseating effect, there is no better way of taking it than with oleum morrhæ. Nor would I rely upon iodine alone, although it acts promptly in most cases. The debilitating condition of the patient may call for a tonic and supporting treatment.

ON THE PATHOLOGICAL CHANGES OF THE
NERVOUS ELEMENTS OF THE SPINAL CORD,
AS OBSERVED IN TWO CASES OF ACUTE
TRAUMATIC MYELITIS.

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(With fifteen illustrations.)

IN the July number, 1883, of this JOURNAL a paper was published, in which I described the pathological changes observed in the cerebro-spinal axis of a case of chronic myelitis of nineteen years' standing, which chiefly consisted in a congestion and degeneration of almost all the blood-vessels, a fibrinous exudate effused into the larger and smaller septa of the affected parts of the cord, and giving rise, by its pressure upon the nervous elements of the white and gray substances, to atrophy of the nerve-fibres and degeneration of the ganglionic bodies. In contradistinction to these changes, produced very gradually in the course of many years, I shall now describe those which I observed in the spinal cords of two cases of acute traumatic myelitis, effected in the short space of a small number of days, or even hours. The first of these cases I had an opportunity to observe personally, enabling me to state the most prominent ante-mortem phenomena; whilst in the other case, which, soon after the reception of the injury, terminated fatally, only the injured portion of the cord was

handed to me for microscopical examination, the autopsy not having been performed by myself or by my assistant.

CASE 1.—William Brown (white), twenty-six years old, received an injury of the spinal cord on July 4, 1880, by falling, probably in a state of alcoholic intoxication, from a second-story window. As the accident happened on a plantation located some distance from New Orleans, nearly three days had elapsed when he arrived at the Charity Hospital on July 7th, 5 o'clock P.M. At this time, when admitted to the ward, the patient was still able to move his fingers, though he had no power to grasp or hold any thing, as, for instance, a cup of water. He could slightly bend the forearms, but was perfectly unable to raise the arms, except by simultaneously moving the shoulders. His lower extremities were, on the contrary, completely paralyzed.

When I observed the patient myself, in the forenoon of July 8th, the whole body, with the exception of the head and neck, appeared to be paralyzed. He was perfectly helpless, so that his body had to be turned or rolled around by the nurse whenever he was fatigued from resting in one position. He could still move his head freely, and his mind was clear, for he intelligently answered all questions put to him. His sight and hearing were unaffected, though both of his pupils were contracted, responding to light but very feebly. There was no difficulty observed in his respiration, and he could easily protrude his tongue in a straight direction. The patient suffered from no pain, except in the back of the neck and in the bladder. In the former region the pain increased when pressure was made upon the spinal column as far down as the fifth cervical vertebra; below this point it commenced to decrease, leaving ordinary sensation downward to the fifth dorsal vertebra. On the chest sensation was present as far down as the fifth rib. Below these points, however, sensation was completely lost, and anæsthesia prevailed over the whole surface of this part of the body.

Over the last sacral vertebra the skin was intensely congested, presenting a dark-blue patch of about one and a half inch in diameter. Though at this time no ulceration could as yet be discovered, the congested portion of the skin was converted into an ulcer before the death of the patient.

The pain in the bladder, already mentioned, was increased by pressure, and this organ being affected with motor-paralysis, the urine had to be removed by means of the catheter. The pain

here generally manifested itself by a sensation of fulness of the organ, inducing the patient to ask quite frequently, about every four or five hours, to have his urine drawn off, though the quantity removed seldom amounted to more than four or five fluid drachms. On the day preceding death, July 9th, the urine, on standing, showed a deposit, which chiefly consisted of pus-corpuscles. The temperature of the patient was always high, though he did not feel the heat; it ranged from 102° to 103° F. until five hours before death, when it rose to 106° F. There was also a profuse perspiration over the whole body including the head. The pulse was very rapid, though not full, until death. On July 9th the motor-paralysis was complete in the trunk and extremities, the patient being only able to move the head. The respiration had become labored, remaining so until death. The pain in the back of the neck had increased, but the mind was still clear. On July 10th the pain had extended to the head, and steadily increased in severity until 6 o'clock, P.M.; the patient, having intensely suffered during the day, became delirious, and died in this condition at half-past 11 o'clock. A few hours before death an involuntary copious evacuation from the bowels took place.

The autopsy, made eleven hours after death, revealed a considerable ecchymosis in the subcutaneous tissue of the back of the neck and thorax, extending from the fourth cervical to the seventh dorsal vertebra. The muscles of this region also were bruised and ecchymosed, the ecchymosis extending laterally as far as six inches from the median line. From the first lumbar vertebra to the sacrum there was a considerable œdema, extending to the sides of the body. The ligaments connecting the laminæ and spinous processes of the seventh cervical and first dorsal vertebræ were found ruptured; the same was the case between the fourth and fifth dorsal vertebræ. On the external posterior surface of the dura mater, between the seventh cervical and first dorsal vertebræ, a coagulum of blood, one half inch in diameter and one eighth inch in thickness, was met with; this had very probably been formed from blood entering from without. In opening the dura mater after its removal,

with the spinal cord enclosed, from the spinal canal, it was found that the cervical portion of the cord had undergone certain macroscopical changes by the injury it had received from the fall of the patient. The most striking of these changes consisted in a constriction of the cord, about one inch in length, and situated in the spinal foramen of the first dorsal vertebra. The circumference of this constricted portion amounted to about two thirds of that of the normal cord. Above and below the constriction the cord presented certain hernia-like bulgings, caused, as the subsequent microscopical examination of the longitudinal sections showed, by a displacement of tracts of nerve-fibres of the white columns. In fact, the whole cord, from a point between the third and fourth roots of the cervical nerves to about two inches below the constricted portion, appeared pressed out of shape, so that, after being hardened in Mueller's fluid, and transverse sections made, the respective gray and white substance presented a somewhat rhomboid form as shown in figure 1. This portion of the cord, also, had lost its normal consistency, and easily yielded to pressure, though it was still sufficiently consistent to be hardened for the purpose of making thin sections. The constricted part, however, was completely softened by degeneration. The cervical portion of the cord, above the roots of the third pair of spinal nerves, as well as the dorsal and lumbar portions below the injured parts, had preserved their normal consistency.

As the spinal cord, at the opening of the dura mater, was found lying straight in the lumen of this membranous tube, the question may be asked in what particular manner the constriction as well as the distortion above mentioned were produced. In considering, therefore, the nature of the injury a little closer, it becomes obvious that the macroscopical changes wrought upon the cord could only have

been produced by a very forcible process; and, as the ligaments connecting the laminæ and spinous processes of the seventh cervical and first dorsal vertebræ were found ruptured, I presume that, by the force incident to the fall of the patient's body from the height of two stories, a transient lateral and rotatory dislocation of these vertebræ—implicating, of course, their articular processes—took place. Now, in consequence of the rotation of one vertebra upon the other, the cord, at this place, became pressed between the margins of these bones, similarly to any other soft body put between two dull and badly fitting scissor-blades, resulting in the constriction, while, at the same time, the neighboring parts of the cord experienced a forcible twisting, giving rise to the distortion mentioned above.

The larger and smaller vessels of the pia mater were congested, the anterior and posterior spinal arteries being completely filled with blood. An exudation, with a great number of exudation-cells had taken place into the subarachnoid space of the cervical region, with a thickening of the arachnoid membrane.

The spinal cord, being removed from the dura mater, was then hardened by leaving it for some time in Mueller's fluid, and then subjecting it to the action of alcohol. In this manner the affected portions of the cord above and below the constriction acquired, in the course of a few weeks, a consistency sufficient to allow the making of thin horizontal and vertical sections. The constricted part, however, forming the centre of the injury, having, by the pressure which it experienced, undergone to a certain extent degeneration and disintegration, always remained soft.

Five days after the death of the patient, when this portion of the cord had acquired a slight consistency, I prepared minute fragments of it by teasing them with the points of fine needles for microscopical examination. The latter

showed a great number of minute portions of the medullary sheath (fig. 7) escaped from the nerve-fibres that had been crushed and torn by the injury; furthermore, numerous distorted nerve-fibres and naked axis-cylinders torn from the interior of the latter either by the injury or by the manipulation of the needles. A number of ganglionic bodies, with or without processes or their fragments, were also observed, either disintegrating or having undergone fatty degeneration. Among the nervous elements numerous capillary hemorrhagic centres, fragments of small blood-vessels, or blood-corpuscles, disseminated throughout the tissue, were also observed. All these changes, however, ought to have been expected as the natural result of the severe crushing or bruising to which the cord had been subjected at this point, for which reason they offer nothing characteristic to the true inflammatory process going on above and below. We shall therefore now turn our attention to the examination of those parts of the cord bordering the constriction, the elements of which had, to a certain extent, remained intact.

As already stated, these portions of the cord had become sufficiently hardened to enable me to make very thin horizontal and vertical sections, which were stained with picrocarmine. Of these the vertical ones remained perfectly intact, while the horizontal ones broke into a few pieces during the cutting, on account of the displacement of some of the white columns above mentioned; but as the whole was held together by the pia mater, I was still able to mount a number of them in glycerine or Canada balsam. The microscopical examinations, however, were not confined to these sections; on the contrary, they were chiefly made on carefully teased preparations obtained from these sections, or from minute fragments of the hardened cord. In truth, the examination of sections, especially those mounted in

Canada balsam, would give us but a very poor insight into the pathological condition of the component elements of the spinal cord, if not associated with that of carefully teased preparations.

Let us now consider the condition of these elements, and commence with the smaller blood-vessels. It has already been stated, that all those vessels of the pia mater, discernible with the naked eye, were found congested. The same was the case with the most of the more minute vessels, the arterioles, capillaries, and venules. Not only were they found filled with blood-corpuscles, but, moreover, certain pathological changes—such as an increase of the protoplasm, of the small cells in the walls of these vessels—were observed. The minute vessels of the cord itself were found in the same condition. Here the increase of the protoplasm, and its subsequent fatty degeneration with that of its nuclei, had, in some instances, assumed enormous proportions, as may be seen in fig. 8. Besides, upon the outer surface of a number of these vessels, a finely granular fibrinous exudate, as well as capillary hemorrhages, in the form of minute collections of blood-corpuscles, were also observed. The latter were most probably produced by the sudden application of pressure, caused by the injury, or by the concussion incident to the fall of the patient.

In passing over to the nervous elements, we shall first take notice of the ganglionic bodies, which, unlike those met with in the soft and degenerated constricted portion of the cord already mentioned, were here found mostly intact with their processes and perfectly stained with carmine, indicating that they had not suffered from any degenerative changes. On the contrary, judging from the intensity of their carmine staining, I rather presume them to have been in a state of parenchymatous inflammation, during which their power of absorbing the carmine was increased. Never-

theless, in a few of these bodies I observed the yellow staining of the picric acid preponderating over the carmine, indicating the commencement of degeneration.

The most striking pathological changes, however, were observed on the nerve-fibres of the white columns, particularly those taken from the upper and lower parts of the constriction, near those hardened portions of the cord from which the sections had been made. Here the nervous elements had not attained so high a degree of degeneration and disintegration as in the middle of the constricted part. A greater number of the axis-cylinders of these nerve-fibres were observed to be more or less swollen, some even to an enormous extent. They were either still surrounded by their medullary sheaths, or laid entirely or partially bare, as may be observed in figures 2, 3, 4, 5, and 6. Whether these fibres lost their medullary sheaths by the crushing force of the injury to which the cord at this locality had been subjected, or by the manipulation with the needles during the teasing process, is difficult to positively determine; but as this part of the cord was, to a certain extent, hardened, and even stained, before the preparations of these fibres were made, I am inclined to attribute the entire or partial removal of their medullary sheaths to the force of the injury. The most of these axis-cylinders were more or less stained with carmine, while a smaller number of them had refused the staining material, having, to a certain extent, already undergone degeneration. In many instances (fig. 2, *d*, and figs. 5 and 6), the swelling of the axis-cylinder was longitudinally quite extensive, whilst in others it had assumed the form of a varicosity. Although the swollen axis-cylinders still showed their granular anatomical composition, the regular linear arrangement of the minute granules, fused with one another, and representing the originally component elements of the ultimate fibrillæ of the axis-cylinders.

ders, had disappeared. In those unstained by the carmine, however, numerous minute fat-globules had already made their appearance. The medullary sheath of almost all nerve-fibres in these preparations was deranged, its fibrillar layer being displaced to form larger or smaller varicosities (fig. 2, *a*, *b*, and *c*, and fig. 3), while its fibrillæ appeared separated.¹ The displacement of the medullary sheaths of these fibres may have been due, on the one hand, to the swelling of the axis-cylinders, and on the other, to the concussion and pressure which the fibres had to bear from the injury. Scattered among the nerve-fibres just described, a considerable number of fragments or small masses of the medullary sheath, escaped from the torn nerve-fibres, were also observed (fig. 7). These masses of nerve-medulla were likewise met with in the different sections of the cord, where they easily might have been mistaken for the product of a fatty degeneration. In examining the vertical sections, I found the nerve-fibres presenting the same varicosities as in the fibres of the teased preparations above

¹ I still regard the medullary sheath of the double-contour nerve-fibre as consisting of two distinct parts, viz.: the "medullary" and the "fibrillar" layers, such as I have mentioned in my paper on the "Dark or Double-bordered Nerve-fibre," published by the Royal Microscopical Society of London in 1874 in the May number of the former *Monthly Microscopical Journal*. At that time, though I frequently observed the fibrils of the fibrillar layers appearing in the form of loops, I regarded this appearance as being produced by artificial changes taking place within the nerve-fibre, and erroneously imagined them to lie parallel to one another in the normal condition of the nerve-fibre. The numerous examinations, however, which I have made on the nerve-fibres since that time, together with a series of special researches on the subject which I made in 1881,—the outlines of the results of which I embodied in a paper "On the Influence of the Structure of the Nerve-fibre upon the Production and Conduction of Nerve-force," published in the proceedings of the Cincinnati meeting of the Amer. Assoc. for the Advancement of Science,—have thus far convinced me that these fibrils are arranged in the form of loops, placed obliquely between the tubular membrane (sheath of Schwann) and the axis-cylinder, giving rise to the so-called "incisures" of the medullary sheath. The interspaces left by these fibrils are filled up by the medullary layer, or true nerve-medulla, a semi-liquid fluid of a fatty nature. As soon as my time will permit, I shall complete these researches, and publish the results in a special paper on the subject. As regards the double-contour nerve-fibres of the cerebro-spinal axis, on which no sheath of Schwann can be demonstrated, I still presume that, though they are held apart by the fibrillæ of the neuroglia, some pseudo-membrane, in the form of a dense layer on the surface of the medullary sheath, too thin to manifest itself by a double contour, exists, preventing the fusion of the nerve-medulla of contiguous nerve-fibres.

described; they were very probably produced by the same causes, though here the swollen axis-cylinders were not so numerous, and had not attained the enormous proportions, as in the neighboring constricted portion of the cord. In these sections, also, the above-mentioned hernia-like bulgings, directly above and below the constriction, were distinctly seen, and found to be produced by the displacement of certain tracts of nerve-fibres, chiefly belonging to the white lateral columns, which had assumed a wavy course.

The examination of portions of this spinal cord taken from the dorsal and lumbar regions showed, in a lesser extent, the same condition of the blood-vessels as in the cervical region, while the nervous elements appeared normal.

In comparing, now, the pathological changes found in the nervous elements of the case under consideration, which has to be regarded as one of acute traumatic myelitis, with the changes which I observed on the elements of the cord of the case of chronic myelitis, referred to in the beginning of this paper, a great difference becomes apparent. In the latter or chronic case, the pathological process consisted in the exudation of a finely granular product or exudate from the blood-vessels, which, by its pressure, slowly caused a simple atrophy of the nerve-fibres not accompanied by any disturbances of their axis-cylinders or medullary sheaths; while in the other case, distinguished by the symptoms of acute myelitis, we find the axis-cylinders more or less swollen by the effects of the acute inflammatory process, and the medullary sheaths completely deranged. Only the blood-vessels appear in a somewhat similar condition in both cases.

CASE 2.—Wm. Walker, a negro, was admitted to the Charity Hospital during the morning of December 23, 1881. A bale of cotton had fallen upon the back of his head, fracturing, as the

autopsy subsequently showed, the fourth and dislocating the third cervical vertebra, and causing an injury to the cervical portion of the spinal cord, from which he died during the following night, early on December 24th.

The clinical history, such as furnished to me by the gentleman who had been in charge of the case, resembles that of case I, and is as follows :

There was motor paralysis of the upper and lower extremities, and anæsthesia from the shoulders down to the toes. The loss of sensibility was so complete, as to allow the insertion of a pin into the arm of the patient without the latter feeling it. There was no pain anywhere, except under the chin and on the occiput. The head of the patient was abnormally movable. Respiration was entirely diaphragmatic. The pulse was quick but regular, while the temperature of the body ranged from 101 to 103° F. There was also retention of the urine.

As the details of this short history are of but secondary importance to this paper, I shall at once proceed to the description and discussion of the pathological changes, which I observed in the elements of the spinal cord.

The portion of this cord which was handed to me for microscopical examination presented the same peculiar constriction as in the case above described, with the only difference, that in the case of the negro the constricted part was not quite as long as in the spinal cord of the white patient. In accordance with the locality of the dislocated and fractured vertebræ, the injured part of the cord belonged to the upper part of the cervical enlargement. The same hernia-like bulgings and wavy protuberances directly beyond the constriction, produced, as in the former case, by a displacement of certain tracts of the white columns, were also observed here. After the whole portion of the cord was hardened first in Mueller's fluid and then in alcohol, thin horizontal and vertical sections were made, and stained with picro-carmine ; a number of them were mounted

in Canada balsam and glycerine, while others were teased with fine needles. The horizontal sections, I may state, being very thin, broke, as in the former case, into several pieces, owing likewise to the displacement of those tracts of nerve-fibres before mentioned, while the vertical sections remained intact.

The microscopical examination of these sections showed that the changes which had taken place in the nervous elements, particularly the nerve-fibres, were of the same nature as those observed in the former case. The greater number of the nerve-fibres presented varicose swellings, as represented in fig. 9. In many instances the axis-cylinders, being well stained with carmine throughout the whole section, could be distinctly seen to traverse or to fill up the varicosities (figs. 10 and 11). In some nerve-fibres even, the axis-cylinder was observed to present several windings in its passage through the varicosity (fig. 10). In a number of varicosities even, the swollen parts of the axis-cylinder appeared curved (fig. 11). The varicosities which these nerve-fibres presented, depended, of course, upon a derangement of the medullary sheath, which in these places was shortened upon itself, probably by the sudden jerk or pressure which the spinal cord experienced during the accident; and the winding, serpentine course observed on some axis-cylinders (figs. 9 and 10), as above mentioned, was undoubtedly produced in the same manner. Some idea of the intensity and suddenness of the jerk, or jolt, to which the cord was subjected, may be formed by the examination of fig. 12, which represents an axis-cylinder, perfectly stained with carmine, wound upon itself by several curves in a varicosity of the medullary sheath, which was separated from the nerve-fibre during the infliction of the injury. The fibrils of the fibrillar layer, of course, became also separated from one another by the same jerking force.

The swollen parts of the axis-cylinders, however, being, in this second case, always met with within the varicosities of the nerve-fibres, lead to the idea, that the swelling, indicative of a parenchymatous inflammation, was preceded and called forth by the molecular disturbance incident to the bending and winding of this anatomical component of the nerve-fibres. Besides, many of the varicosities may not have been quite as large, as seen in the sections, directly after the infliction of the injury, but may have subsequently increased in size by the swelling of the axis-cylinders. The comparative difference which existed in the diameters of the swollen axis-cylinders may be seen in fig. 13, representing the transverse sections of four nerve-fibres taken from the white columns of a very thin horizontal section of the spinal cord above the constriction; the axis-cylinders here are well stained with carmine.

Scattered among the distorted nerve-fibres of both horizontal and vertical sections were observed a great number of small masses and fragments of the medullary sheath, escaped from the nerve-fibres torn by the injury upon the cord. Some of these masses (fig. 14) exhibited a fatty lustre, as if they had undergone fatty degeneration.

The ganglionic bodies observed in the sections were found highly stained with carmine, but appeared morphologically normal.

The smaller blood-vessels both of the pia mater and the spinal cord were found congested. The more minute vessels of the cord, also, were mostly observed to be filled with blood-corpuscles, and many of them met with surrounded by a granular fibrinous exudate (fig. 15).

In making a comparison of the pathological changes observed in the anatomical elements of the spinal cords of the two cases of acute traumatic myelitis above described,

it becomes evident, that they were produced not only by the same pathological process, that of acute inflammation, but also by the same mechanical causes. The only difference observed in the histological changes of the nervous elements was owing to the degree, or extent, to which the inflammatory process had advanced, and, accordingly, manifested itself in the difference existing in the condition and dimensions of the swollen axis-cylinders. Thus, while the swellings of the axis-cylinders of the nerve-fibres in the cord of the second case had, in the short space of fifteen or sixteen hours, only advanced to form a simple varicosity (fig. 11), we behold in the first case—lasting more than six days before ending fatally—the same swellings extended more or less in a longitudinal direction over the axis-cylinders, while, at the same time, fatty degeneration has made its appearance in a number of the latter. We may therefore conclude, that if the negro had lived some days longer, the swellings of the axis-cylinders of his spinal cord would likewise have longitudinally extended, accompanied by fatty degeneration in its incipient stage.

Explanation of the Illustrations.

FIG. 1.—Section of the cervical portion of the spinal cord of case 1, showing the distortion of the gray and white substances.

FIG. 2.—*a*, a nerve-fibre exhibiting some slight varicosities; the swollen axis-cylinder protrudes from the torn end of the fibre; *b* and *c*, two nerve-fibres exhibiting more extensive varicosities and a hernia-like protuberance; *d*, an enormously swollen axis-cylinder deprived of its medullary sheath.

FIG. 3.—A swollen axis-cylinder covered by its medullary sheath.

FIG. 4.—A swollen axis-cylinder of a fine nerve-fibre.

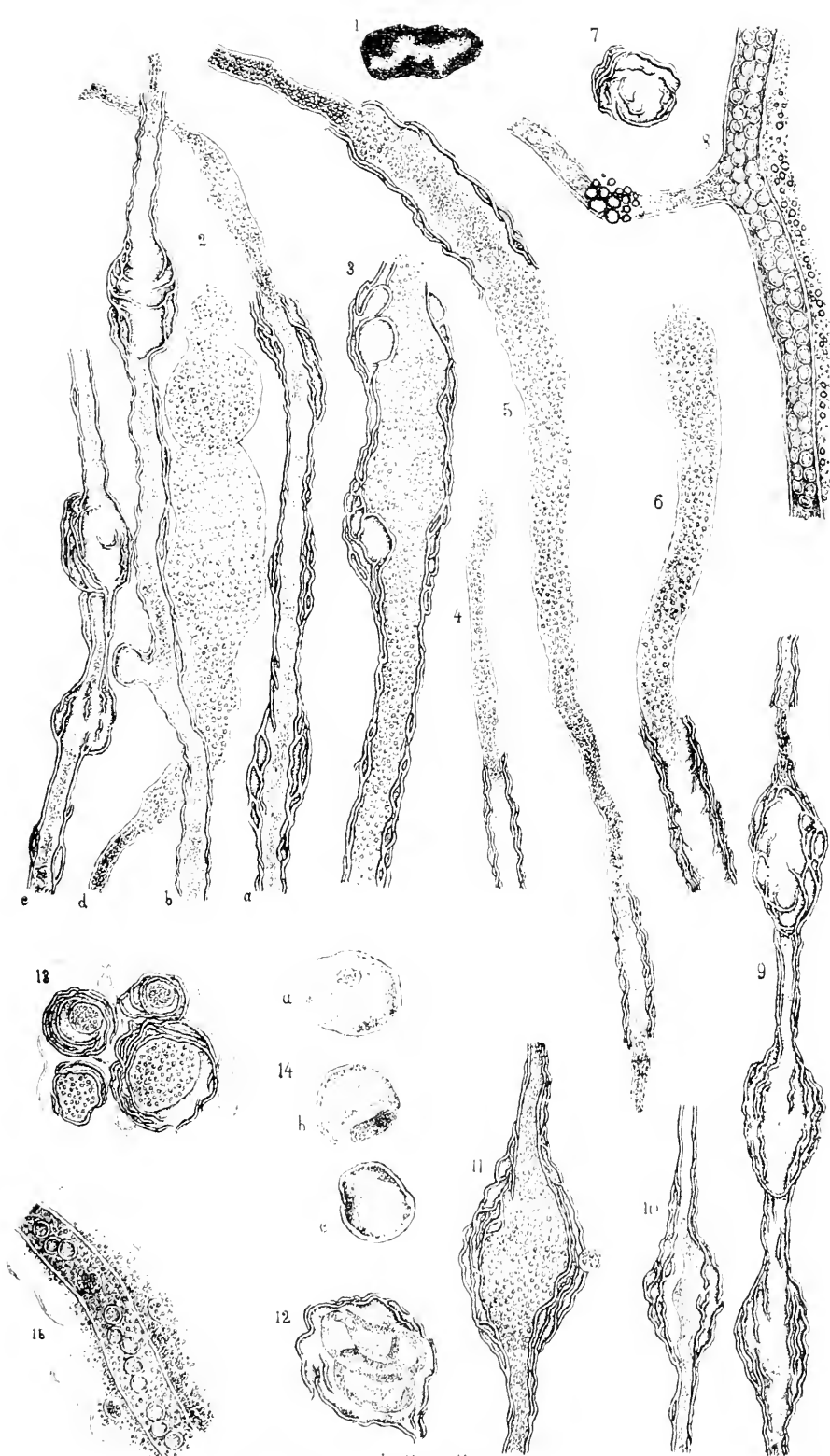
FIG. 5.—A swollen axis-cylinder of great length.

FIG. 6.—A swollen axis-cylinder with a club-shaped extremity protruding from the medullary sheath.

FIG. 7.—A fragment of medullary sheath escaped from the torn end of a nerve-fibre.

FIG. 8.—A minute blood-vessel showing the protoplasm of the minute cells of its walls enormously increased, with fatty degeneration of the nuclei.

FIG. 9.—A nerve-fibre exhibiting the character of the varicosities, as observed in the spinal cord of case 2.



drawn upon the stone by the author

FIG. 10.—Shows the curves and windings which an axis-cylinder has assumed in the varicosity of a nerve-fibre.

FIG. 11.—Portion of a nerve-fibre with a varicosity filled up by a swollen axis-cylinder.

FIG. 12.—A varicosity detached from the nerve-fibre and containing a portion of an axis-cylinder rolled up by several windings.

FIG 13.—Transverse section of four nerve-fibres showing the difference existing in the diameters of the normal and swollen axis-cylinders ; a few fibrillæ of the neuroglia are seen to adhere to the fibres.

FIG. 14.—Fragments of the medullary sheath undergoing fatty degeneration ; *a* and *b*, fragments with small portions of the fibrillar layer still adhering ; *c*, fragments of nerve-medulla completely degenerated.

FIG. 15.—A portion of a minute blood-vessel from the spinal cord of case 2, surrounded by a granular fibrinous exudate to which a few neuroglia fibrillæ are seen adhering.

A CASE OF TRAUMATIC ATAXIA.

By A. B. ARNOLD, M.D.,

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A Danish sailor, twenty-three years of age, fell from the deck of his ship, and was found lying on his back. He had to be carried to a hammock, as he was unable to get on his feet. No outward injury could be recognized, but he complained of much pain in the small of the back. At the end of the week he was able to walk about with the assistance of a stick. Six weeks from the date of the accident he arrived in port, and was admitted to the City Hospital.

Present condition: The man still complains of some pain in the back, which is limited to the sacro-lumbar region. Careful examination discloses no injury to the spine. There is nowhere the least tenderness along the whole length of the vertebral column. The gross muscular power of the lower extremities appears to be intact. When the patient is asked to extend the limbs, it requires considerable force to bend them. While in bed he can freely move them about. The upper extremities and the sphincters are not affected. All the different qualities of sensibility are unimpaired. There is absolutely no anæsthesia, but the knee-jerk cannot be elicited. Motor disturbances of a decided ataxic character are well marked. The man rises slowly and deliberately from his seat, and experiences difficulty in assuming the erect position. He balances himself with his arms, and keeps his legs widely apart. On bringing his feet close to each other he reels, and would fall over if not prevented. His gait is exceedingly unsteady and awkward. The limbs are thrown forward and outward, there is hardly any flexion at the knee joint, and the whole sole of the feet touches the ground at once. The

patient is utterly unable to stand, and much less to walk, when he closes his eyes.

This case is but another example of disturbance of co-ordination in the absence of anæsthesia. The traumatic lesion of the cord, probably of the nature of contusion, may be supposed to have involved a definite portion of the nervous apparatus which controls the co-ordination of movements.

ON THE ADMISSION OF INSANE PERSONS TO ASYLUMS.

BY LEONARD WEBER, M.D.

I N the first number of the *Med.-Legal Journal* we read that the Permanent Committee of the N. Y. Medico-Legal Society consider the proceedings required by our present laws on lunacy for the purpose of committing a patient to a lunatic asylum, as not sufficiently stringent to guard against abuse. It is demanded—in harmony with or deference to public opinion on the subject—that the patient be brought into Court, if possible, and committed by the Judge upon the testimony of two experts. In addition to that it is thought necessary to have a Board of Commissioners in Lunacy, as they have in England, to visit asylums, and with power to discharge inmates, if they see fit to do so.

However desirous it may be to use all proper means to put a stop to the horrible practice of sending a sane person to an asylum, it seems to me that so ponderous a system of legal inquiry, combined with a good deal of disagreeable publicity of proceedings, will be apt to defeat in a great measure the main purpose for which asylums are or ought to be conducted, *i. e.*, the possible cure of the insane. All observers are agreed that, in the vast majority of cases of mental alienation, the patient cannot be successfully treated at his home, and that his chances of recovery are the better

the earlier he is removed to an asylum. It is obvious, then, that the prompt removal of the patient to an asylum, for his own as well as the safety of his fellow-beings, ought to be facilitated; but the new measures proposed by the committee are far from accomplishing this object.

In place of making concessions to public opinion which we know to be detrimental to the patient's welfare, it will be more to the purpose to enlighten it on this important matter, and try and prevent crime by visiting severe punishment upon those who are found guilty of sending a person of sound mind to an asylum. Those who have studied the system of superintendence of asylums by the State or county authorities in England will not recommend it, I trust, as worthy of emulation here.

NEW YORK NEUROLOGICAL SOCIETY.

A regular meeting was held October 12, 1883, the President, Dr. WILLIAM J. MORTON, in the chair.

THE NEUROTIC ORIGIN OF PROGRESSIVE ARTHRITIS DEFORMANS.—Dr. LEONARD WEBER read a paper in which he briefly recapitulated the symptomatology and etiology of the disease, and stated his views concerning its nature. He said that, among the comparatively large number of cases of arthritis deformans which he had seen in the course of the last twenty years, he could not but recognize sorrow and grief, fright, irritation, and exhaustion of nerve-centers by sexual indulgence and the leading of a dissolute life—factors just as potent in producing the disease as rheumatic influences, if not more so. Again, remembering the symmetrical appearance and progress of the disease in most cases, no more plausible explanation seemed possible than the supposition of causes located in the central nervous system. The neuralgic and tropho-neurotic symptoms also supported this view, though it was not to be forgotten that in a spine stiff and deformed by arthritis there might easily occur changes of innervation producing neuralgias and tropho-neurotic alterations secondary in character. Finally, the negative results which he had had in treating polyarthritis deformans after the usual anti-rheumatic method, with iodides, colchicum, etc., and, on the other hand, the very positive results obtained in similar cases by the galvanic treatment of the central nervous system, combined with a generous diet and the persistent administration of cod-liver oil and iron, had led him to believe in the neurotic origin of the disease in many cases. It was through the failure of

the old method that he first became convinced of the erroneousness of the conventional opinion of the rheumatic or gouty origin of this formidable malady. Up to the present time no autopsies had been made with reference to the condition of the nerve-centers in this disease, and it would be a fit subject for future research to find the changes in the cord, presumably in the anterior horns, which might induce certain forms of arthritis deformans.

With regard to the main features of the disease he had this to say: As a rule it began and developed very slowly, without any other symptoms at first than pains in one or more joints, which came and went either spontaneously or after exertion. Not infrequently the patient complained at this early stage of an unusually tired feeling in the joints. The pains were neuralgic in character, circumscribed or diffused through the limb. In the peripheral form, the joints of both hands and feet; in the central variety, the hip, knee, and spine, were the parts affected. In the course of time a great deal of stiffness and discomfort were experienced. The joints were enlarged and became unshapely by the proliferation of hard, osseous protuberances on the outer surface of the swollen epiphyses, and creaking or cracking in moving or handling them was perceptible to the patient as well as to the physician. The adjacent soft parts, particularly the muscles, showed, in a comparatively early stage of the disease, a degree of atrophy not at all commensurate with their passive condition alone, but much more due to peculiar nutritive changes of neurotic or myotic origin.

In the peripheral form, the disease affected the joints almost symmetrically on both sides; in the central form, the advance was irregular. In one case he had seen it remain stationary in the hip joint for many years, but attacking some joints of the fingers and toes at last. In another case, that of a female patient about thirty-five years of age, the upper part of the body only was affected. He had now a case under observation where nearly all the joints in the body were badly affected when he first saw the patient, who had been a helpless cripple for many months.

The disorganization of the shoulder, knee, and particularly the hip, led often to a considerable shortening. In one of his cases, still under observation, the shortening of one lower limb amounted to nearly three inches.

In the spinal vertebræ ankylosis was more quickly developed by the disease than in other parts of the body. One of his patients could neither bend nor turn her head when he first saw her, the entire spine being stiff, but there were no symptoms of compression, or even of remarkable irritation of the cord. The disease was slowly but steadily progressive; while it might remain stationary for a length of time, exacerbations were sure to follow. Fever or other great constitutional disturbances he had not noticed in its course. In a female patient, aged thirty-seven, he had found the urine to have a specific gravity of 1,026 containing some sugar, and phosphates in abundance. Her mother had diabetes, and was a sufferer from arthritis deformans at the same time.

The following cases were selected from his records, as illustrative of the points he wished to bring out:

CASE 1.—Mrs. M., aged forty-seven, American, no syphilitic or hereditary taint, but a sister is reported to be a sufferer from chronic rheumatism. Married early in life, went on the stage, and, as a somewhat prominent actress, led an active and varied life, experienced many changes of fortune, travelled a good deal, and never hesitated to expose herself to wind and weather, yet always enjoyed good health until two years and a half ago, when, after a premonitory period of worry and depression of spirits, she experienced pains in both wrists and elbows, followed by swelling and distortion. The hands and feet soon followed, and, when he saw her first, Feb. 27, 1883, she had not a joint that did not creak or crack or was not out of shape, except those of the clavicle and the lower jaw. The knees and spinal vertebræ were in the worst condition and the most painful. Standing or walking, even with support, was out of the question. Her urine contained phosphorus, but no albumen. She slept poorly, and her general nutrition was bad; the bowels were irregular. No treatment had so far done any good, but the disease had made rapid and steady progress. Ordered:

℞ Propylamini (trimethylamini), f 3 j ;
 Oleosacch. citri, f 3 ij ;
 Aquæ, ̄ viij.

M. S.—A tablespoonful before each meal.

Ordered, also, two pills of sulphate of iron and carbonate of potassium after each meal ; good food, and a tablespoonful of cod-liver oil three or four times a day. Galvanism to the spine and the cervical ganglia of the sympathetic three times a week. The local and general improvement had been so satisfactory that she was now able to get up and around with the help of a cane, and to do light work with her hands. The pain, swelling, and distortion of the joints were much less ; sleep and nutrition were greatly improved.

CASE 2.—Mrs. K., aged thirty-four, German, married twice, had had two still-births and two abortions ; second husband had syphilis, and died of phthisis. She presented no signs of either disease ; no hereditary influences. In 1877-'78 she had a severe attack of bronchitis, that troubled her the whole winter, but eventually got well without any apparent damage to the lungs. After some years of trouble, anxiety, want, and exposure, arthritis deformans broke out two years ago, with pain and swelling of the small joints of the hands and feet, soon spreading to one knee, shoulder, and hip. The disease was preceded by severe headaches, from which she suffered yet occasionally, but less violently. Some of the joints presented a gelatinous feel, and several nodules could be felt beneath the integument of her arms. There was no pain on pressure over the sternum, the clavicle, or the tibia. Neither specific nor so-called anti-rheumatic treatment was of any service, but the disease has been very tardy in its progress, and the disfigurement of the joints was not to be compared to those in case 1. She had always been able to walk, though not without pain, and from time to time been confined to her room. Her appetite and general nutrition were not good. The treatment described in case 1 was begun in Jan., 1883, and carried out pretty regularly up to the present time, except as to the application of electricity. The result thus far had been satisfactory ; the progress of the disease had been stopped ; and the pain, swelling, and disabilities of locomotion were much less.

CASE 3.—Mrs. K., aged thirty-five, American ; married, multipara. Father in good health, mother suffering from diabetes and

arthritis deformans. Patient well built and nourished ; living in good circumstances ; had been for some years very unhappy in her domestic relations, and been often deprived of rest and sleep, and otherwise maltreated. After a series of premonitory symptoms, such as hemicrania and neuralgia in the upper extremities, she showed the first symptoms of the disease in the fingers, wrists, and shoulders about a year ago. Her urine contained phosphates (in large amount) and a little sugar. The affection had made no great progress as yet, and the treatment had not been carried out well enough to be of great service, owing to irregular attendance on the part of the patient.

CASE 4.—Mrs. H., aged fifty-five, multipara ; no hereditary taint ; no apparent cause other than a good deal of anxiety and grief on account of the persistent ill-behavior of her only son. The first symptoms appeared in the small joints of the fingers and toes five years ago. So far, she had not experienced any great inconvenience from her affliction, but whenever she took the propylamine mixture and cod-liver oil for some time, great relief followed as to pain and swelling.

CASE 5.—Mrs. S., aged sixty-five, German ; married, multipara ; no hereditary taint, but a good deal of exposure to rheumatic influences in her younger days. The disease first attacked her right hip joint fifteen years ago, which led in the course of time to a shortening of nearly three inches, and now to complete ankylosis. No other joints had suffered until recently, when several small joints of the hands and feet became affected, and she had to take to her bed. Various sorts of treatment were employed to no purpose. For the last three months she had been taking propylamine, and the compound syrup of the hypophosphites, with the result that she was now able to be about again, and that no other joints had been attacked.

CASE 6.—Mr. G., aged sixty, Austrian, clergyman, single, of good constitution and no hereditary taint. He had served as a missionary in his prime, and had travelled extensively in South and Central America. He was, of course, exposed to the severe effects of unwholesome climates, and suffered many hardships besides. He had severe attacks of rheumatism, of which he got well, but eight years ago it settled in his right hip and left knee, and when Dr. Weber first saw him, five years since, he was in constant agony, confined to his bed for many months, and the joints mentioned presented all the characteristics of advanced

arthritis deformans. Some of the joints of his hands and feet had also become recently affected. His urine contained albumen in considerable quantity ; there were amblyopia, the ophthalmoscopic examination showing the affection of the retina often found in Bright's disease and atheroma. By the use of the iodides and the other remedies, he was but little relieved, but two seasons at the Hot Springs of Virginia removed the severe recent affections of the joints, relieved his kidney trouble, and considerably improved his sight. The old affections of his hip and knee remained as before, but ceased to give him much trouble, so that he was able to be about to attend to his clerical duties.

Dr. E. C. WENDT, in opening the discussion, said that he had seen a number of cases of arthritis deformans, mostly in hospital practice, all of which had, under the usual plan of treatment, gone on from bad to worse. He had also seen one of Dr. Weber's cases, in which a marvellous result had been obtained, in a comparatively short time, by an entirely different plan of treatment. He thought the value of Dr. Weber's paper lay mainly in the therapeutic suggestions which it contained. If other observers corroborated the ideas here advanced, a decidedly progressive step would have been taken. He thought it was important to elucidate the causation of the disease: mere symptomatic treatment was quite irrational.

Dr. C. L. DANA remarked that the few cases seen by him had not illustrated the neurotic origin of the disease. In New York the disease, he thought, was rarely met with in private practice. He had seen only a few cases in hospital and dispensary service; this was even true in the Marine Hospital for Sailors, where rheumatism abounded. He recollected having seen one aggravated case: the patient was an old woman, some seventy years of age, who had suffered from the disease for sixteen or seventeen years. It began in the vertebral column, and gradually involved the hips, knees, and toes. She was so helpless that, in order to evacuate her bowels, it was necessary to place her in the horizontal position over a pail. She had Bright's disease, and died of apoplexy. On post-mortem examination deposits of urates were found in the joints of the great

toes. The patient was poor, and surrounded by all the conditions favorable to the development of the disease. Dr. Dana said he had seen some women of a neurasthenic type—women who had suffered from functional nervous disturbances—who developed a kind of inflammatory swelling of the fingers, so that in one case the hands became almost useless. He did not know but that, later on in life, these cases might develop into arthritis deformans, and, if so, would illustrate the theory advanced in the paper. In considering neurotic inflammations of joints, Dr. Dana thought the relation of the trophic nerves to them, if there were any trophic nerves, should not be lost sight of. Never, as far as he knew, had we found any articular disease following from functional nervous trouble. The nervous difficulty must be organic. In no experiment upon animals, except where an organic lesion of the spinal cord had been produced, had we been able to produce arthropathies.

Dr. WENDT did not know that the author's paper contained any evidence that the disease was developed from an organic lesion of the spinal cord. If there had been such disease of the spinal cord, improvement could not have been so rapid. He thought the neurotic condition was not the ultimate, but an intervening, cause. If we would go back sufficiently far into the history of these cases, he thought we should find that there was at first a disturbance of nutrition, on the basis of which the neurotic condition developed.

Dr. F. A. BURRALL wished he could add something to our knowledge of this subject. The disease was one we were continually meeting. It seemed to him to be an arthritis resulting from trophic changes. In two cases which he could now call to mind, these changes resulted from worry. One patient had gouty trouble. There was no uric acid found in the urine of patients suffering from arthritis deformans. As far as remedies were concerned, he knew of only two—arsenic, which was a nerve-tonic, and *Eupatorium perfoliatum* (boneset).

The PRESIDENT felt like adding a word in regard to the

practical part of the paper. He had not seen many cases of arthritis deformans in private practice; he could only recall five. It was probable that most cases were seen by the general practitioner. In the first four he had met with unsatisfactory results; but in the last, becoming convinced of the fruitlessness of the anti-rheumatic plan of treatment, he had administered cod-liver oil, iron, and static electrization with great benefit to the patient. He was of the opinion that the disease occurred most frequently in the so-called neurasthenic. It was interesting to note that the first advocate of the neurotic origin of the disease was an American, Dr. J. K. Mitchell, the father of Dr. S. Weir Mitchell, now of Philadelphia. At this very early date, 1834, Dr. Mitchell announced it as his theory that acute, subacute, and chronic rheumatism were diseases of the spinal cord. The neurotic theory of the origin of the disease in certain subacute forms was a very attractive one. He was prepared to admit, as an argument in its favor, that the ordinary anti-rheumatic treatment failed to relieve the patient. In the next place, there was a well understood relationship between the disease in question and well recognized nervous ailments. We had only to call to mind the arthropathies of the myelitis of traumatic neuritis in certain hemiplegiacs to find a defensible relationship to the changes in the joints characteristic of arthritis deformans.

A regular meeting was held November 6, 1883, Dr. WILLIAM J. MORTON, President, in the chair.

A case of clonic torticollis was presented by Dr. GRAEME M. HAMMOND, and a paper entitled "Points of Interest in Chorea" was read by Dr. HENRY D. CHAPIN, followed by an exhaustive discussion which we are unfortunately unable to present, owing to the failure of our stenographer to make a report as expected.

A regular meeting was held December 4, 1883, Dr. WILLIAM J. MORTON, President, in the chair.

NEUROTIC AFFECTIONS ACCOMPANYING JOINT LESIONS.—Dr. GEORGE W. JACOBY read the following paper:

The history of the subject goes back as far as Hippocrates, by whom it is mentioned. John Hunter was the next

to take any note of it, and it is with him that the sympathetic theory originated. Malgaigne (1826) and, within the last ten years, Weir Mitchell, Duchenne, Verneuil, Sir James Paget, and Charcot and his pupils, comprise the list of names that have cast light upon the subject. The experiments of Valtat show conclusively that, as a result of injury to the articular or even to the peri-articular tissue, produced by irritant injections, the muscles of the entire limb, but more particularly the extensors of the joint, become atrophied. The result of the experiment given in the paper, as shown by the autopsy, is that the extremity which was experimented upon lost eighty grammes in weight in twelve days, and that each and every muscle separately weighed less than its corresponding fellow of the left side.

The affections which most frequently follow joint disorders are paralysis and atrophy of the muscles, and hyperplasia of the subcutaneous connective tissues. More uncommon are anæsthesia, hyperæsthesia, analgesia, hyperalgesia, and neuralgias. Three groups of nerve functions are implicated—motility, sensation, and nutrition.

Symptoms.—After the joint lesion, there is a change in the appearance of the limb. The extensor muscles are generally the ones involved. There is a change in the electrical reaction of the muscles; their contractile power is diminished, and finally lost. There is no reaction of nerve degeneration, no reversal of the normal contraction formula. This is also most noticeable in the extensors. The paralysis may appear as early as twenty-four hours after the accident; it may also appear very late. The hypertrophy of subcutaneous connective tissue seems to stand in a direct ratio to the atrophy of muscular substance. The atrophy is ascending and progressive. Contracture is rare. The disorders of sensation are early symptoms, and the differential diagnosis between these affections and progressive muscular atrophy may become difficult.

The conclusions which I am entitled to draw from the notes of thirty cases are: 1. That in all cases, except those involving the ankle or wrist joint, the muscles affected were the extensors of the diseased articulation. 2. That, in

those cases which involve the ankle or wrist joint, the affection is descending instead of ascending, and that the extensors are not affected to any greater extent than the other muscles. 3. That, in cases of arthritis of any of the joints of the fingers, the interossei muscles suffered first and most.

The cases which present particular interest are the following :

CASE 1.—Mrs. L., aged twenty-four, while walking, slipped and fell, striking her right knee. The joint rapidly increased in size and was very painful. The following day it was very much enlarged, the patella pushed forward, and fluctuation was distinctly noticeable. The joint affection improved rapidly, but upon the seventh day a distinct paralysis was noticeable. The movement of flexion of the leg upon the thigh was easily executed, but that of extension was performed with great difficulty. Patient could only by the strongest effort produce any contraction of the triceps cruris. As the effusion became absorbed the paralysis increased, and at the end of three weeks it was impossible for her to extend the leg at all. Atrophy was now well marked, showing a difference of three centimetres in favor of the healthy limb. The gluteal muscles were also involved. The electro-contractility of the muscles was decreased to both currents.

CASE 2.—This case shows how soon after the injury paralysis and atrophy may ensue. Patient, a laborer, aged thirty-four, was struck upon the left knee on a Friday afternoon. He applied ice to the joint. The swelling went down. I saw him on the following Monday, seventy-two hours after the injury, and then a distinct paralysis of the triceps was noticeable, and atrophy was distinguishable upon the following Friday.

CASE 3.—By this case may be seen how entirely disproportionate the effect may be to the cause. Patient, L. H., merchant, aged thirty. While walking, his left ankle joint turned, the outer margin resting upon the ground. Notwithstanding severe pain, he continued his walk. Used the joint for several hours. When he examined his foot he did not notice any change in the appearance, but it was painful on pressure. After two months he noticed a slight weakness in the injured leg, which was particularly observable upon going down stairs. Four months after the accident I saw him. His condition was then as follows : His foot hangs with the toes pointing downward, and cannot be brought to a

right angle with the leg. He walks upon his toes, and does not bring his heel to the ground. The toes may be easily raised, but they fall back again by their own weight. The interossei muscles of the foot are atrophied. The peroneal muscles and those of the thigh are also involved. The gluteus maximus is evidently considerably atrophied, for a large depression takes the place of its former prominence. Added to this, severe neuralgia of the sciatic and peroneal nerves rendered his condition almost unendurable.

The pathogenesis of the affection is still a disputed one. The sympathetic of Hunter, the pressure theory of various writers, the theory of functional inertia, then that of Vulpian, which is reflex, and, finally, those of Decosse and Charcot, are all incapable of satisfactorily explaining all of the cases.

The treatment, in order to be successful, must be varied and adapted to each special case. The chief agents at our disposal are electricity, massage, mechano-therapeutics, and hydro-therapeutics in the form of hot and cold douches. Massage, in very many cases, seems to deserve preference to the electrical currents. The effects producible by massage are :

1. The diffusion of any articular effusion ;
2. The comminution of vegetation ;
3. The loosening and destruction of adhesion ;
4. Increase of circulation ;
5. Stimulation of muscular fibres.

In fact, all the agents above mentioned seem to act similarly by stimulating the nutrition of the affected muscles, by increasing the flow of blood to the parts, and perhaps thus causing a reflex excitability of the motor tracts.

Dr. CHARLES F. TAYLOR said the subject was one with which he was familiar, as all persons engaged in the treatment of joint affections must be, but it was too large even to touch upon, in many of its aspects, in the limited time at his disposal. He was obliged to differ with the essayist, both as to the pathology and as to the treatment of the neurotic disturbances attending or following joint diseases of the character which he had set forth in the paper. In regard to the pathogenesis, he did not think it necessary to

adopt any peculiar theory, or to assume that even any special deviation from the ordinary course of nerve function took place, in order to account for all the facts observed in these cases. The difference was one of degree only. A person was attacked with inflammation of the knee joint, for instance. This was rapidly followed by diminished size of the muscles controlling the action of that joint, with diminution and sometimes even entire loss of muscular action. But loss of muscular action was by no means evidence of loss of muscular power. The nerve-centres were unquestionably affected, but the cerebral nerve-centres were the seat of the greatest disturbance. No theory could be adequate which left the cerebral nerve-centres out of account, and the consequent mental element, which played, in his opinion, so important a part in these cases. The simple loss of muscular action, consequent on an attack of inflammation of the knee joint, was sufficient to account for an immediate diminution of the size of the muscles whose freedom was curtailed. This was the certain result of mechanical restraint alone. But if, besides the mechanical restraint of position or retaining apparatus, there were added the mental restraint of fear, the difference in the rate and amount of muscular atrophy was enormously increased. Mental restraint acted like an Esmarch's bandage: it squeezed the very life out of a muscle. As a very simple proof of the remarkable effect of mental restraint in causing muscular atrophy, he would mention those frequent instances accompanying disease of the hip joint. These patients often applied with limbs attenuated to the last degree. That a large portion of the muscular attenuation accompanying somewhat long-standing hip-joint disease was due to the mental restraint of motion, which might cause suffering, was proved by the fact that the application of proper mechanical protection, by which the mind was relieved of the fear of pain, was followed by immediate increase of muscular growth. This was so common and well-known a fact that advantage was constantly taken of it in the management of cases. His observation of the effects of joint diseases on the muscles must have included some thousands of cases, and he had never seen a case of

atrophy which, in his opinion, could not be perfectly explained by non-use and mental restraint.

In regard to the therapeutics of muscular atrophy and loss of action following joint disease, he feared he must differ with the essayist quite as widely as in regard to their pathogenesis. So far as the muscular wasting had been caused by non-use, during the progress of the arthritis, it was sufficient to set the muscles to work again after the inflammation had subsided. Muscles stubbornly refused to act, or, if forced to act, they as stubbornly refused to develop, during the progress of an arthritis. We must wait till the joint was well before we could expect the muscles to act readily. It was astonishing to notice how deep and lasting the impressions made on the cerebral nerve-centres sometimes were. Whatever the treatment might be, he did not believe it could be of any direct service so long as a mental restraint over the muscles was continued; and it was equally true that whatever would remove such mental restraint would cure the atrophy. So important did we consider the mental influence over the muscles, attending and following joint diseases, that we took special pains to get and keep the direction of that influence, for the very purpose of hastening the recovery of the muscular power, after curing the joint disease. But the object of treatment should be to divert the mind from the affected member, rather than to keep up attention to it, by local treatment. It was true that massage would sometimes seem to do much good to the atrophied muscles; but this was apparent and indirect rather than real and direct. Massage had elements of mental diversion and control which might be properly and usefully employed. But, with a large experience in its use, he was free to say that he thought it was very much overestimated as a direct therapeutic agent. Its direct effect on the muscles was very slight, and what there was was not exercise. Exercise involved nerve action as the initial force. Massage merely assumed to promote the forward displacement of a certain small portion of the tissue fluids. But such propulsion of the fluids contained in the soft parts, even if effected, was not exercise, nor a rational substitute

for exercise. Only by the legitimate use of the nerve-centres, especially of the cerebral nerve-centres, could there be any action deserving the name of exercise. To regulate such nerve-centre function, when disturbed by the strong impressions made by joint inflammations, was the indication presented in the cases under discussion. In most cases time alone was sufficient. In others any means which effected a diversion of attention, whether applied to the affected member or at a distance from it (which was the safer plan), would effect a cure. Incidentally, massage, electricity, the manipulators of the so-called "bone-setters," as well as the "animal magnetism" of the more arrant quacks, all did appear to produce wonderful results in a certain number of cases. The results were real, but were not produced through any direct effect on the parts, but through the incidental impressions made on the cerebral nerve-centres; in other words, on the mind. The worst of it was a large number of cases in which direct treatment of the part affected by the mental restraint tended to increase the mental impression, and to indefinitely postpone that unrestrained action of the muscles by which alone they could regain their power. The most difficult cases within his experience had been those in which the patients had had their attention to the affected member kept up by too much local treatment after the joint inflammation had passed away.

Dr. LEONARD WEBER had seen some cases of muscular atrophy following joint disease, and remembered one in particular, which might be of interest to the Society:

Mr. J. W., aged thirty-two, merchant, of nervous temperament, but strong and active, made a tour through Switzerland in the summer of 1879. Being a good pedestrian, he travelled mostly on foot, but, after a severe Alpine tramp in the upper Engadine, he was taken with synovitis of the knee joint. When the effusion had passed away, the extensor muscle above the knee had wasted considerably; the patient was unable to walk, and reached New York with difficulty. On examination, the joint was found to be in good order again, but the atrophy of the extensor muscle was still very marked, and the patient, by the support of a cane,

walked, but not without difficulty. A four weeks' course of faradization made no appreciable change, and, although he was assured that he would regain the use of his limb completely in the course of time, he was not satisfied, but grew despondent, and finally left for Europe to consult Professor Erb. The latter told him the paralysis was not in his limb, but in his mind; that he should go about and exercise and live well, and he would soon regain the full use of his muscles. He followed this advice, and returned to New York early in the spring of 1880, in perfect health.

As to the pathogenesis of the disorder, Dr. Weber believed that the muscular paresis and atrophy in the case reported, and in others of a like character, were of reflex origin, and that functional disturbances of motor centres in the brain, and not in the spine, were probably the cause of the trouble. Of massage and its effect in such cases, as reported by the author of the paper, he had had no personal experience, but had seen excellent results from its proper application in subacute joint diseases, muscular rheumatism, and bad sprains.

Dr. E. C. WENDT said that the paper had brought out several points of interest, especially as regarded ætiology, symptoms, and the hopefulness of treatment. He was sorry to find, however, that the reader had nothing new to offer in explanation of the pathogenesis of these conditions. Admitting the correctness of Sappey's views concerning the richness of the articular and periarticular tissues in nerves, it certainly seemed thoroughly puzzling why acute polyarticular rheumatism was not more frequently followed by just such accidents as Dr. Jacoby had described. Again, those more chronic joint manifestations dependent upon the gouty diathesis, where profound structural alterations were frequently observed, only quite exceptionally led to atrophy, paralysis, and the other neurotic disturbances alluded to. Upon these points he was sorry to find that the paper under discussion left us as much in the dark as we had been before.

With regard to massage, although his experience was limited, it was yet sufficient to fully convince him of its utility in certain cases. Of course, there was massage

and massage; but, when properly and systematically applied, it was useless to try now to dispute its beneficial action. The combined experience of a large number of competent men placed its usefulness beyond the pale of doubt.

Dr. C. HEITZMAN said: "When I was a student in Vienna, a girl, twenty-five years of age, fell down stairs and acquired serous gonitis, after which she was paralyzed and confined to her bed for five years. She was sent to a water-cure. A physician there urged her to walk, in order to enable him to judge about the degree of the disease, but she began crying, and said she was unable. She went home in despair. Her sister urged her to make at least an effort to walk. After considerable urging, she got out of bed and walked. This illustrates that mental influence has much to do with these affections.

"I would call the attention of Dr. Jacoby to an article by Dr. Nicoladoni, published, in 1871, in the *Wiener med. Jahrbücher*. I have seen his specimens, with the nerves brought out by the use of chloride of gold, and, from my observation, I am convinced that these terminal nerve-fibres are not stable and unchangeable formations, but, on the contrary, that new nerve-fibres may form at any time of life from the living matter present in all tissues.

"I am thoroughly convinced that nerves may disappear and appear, according to certain physiological necessities, certain physical conditions of the body, such as, for instance, are results of exercise.

"In an inflammation of a joint, the synovial and capsular wall being the seat of pathological changes, of breaking down of tissue, certain nerve-fibres of the sensitive sphere will be within its range, and we should know that a certain number of them perish altogether.

"Dr. Jacoby, to-night, did not give a theory of his own, but quoted various authors. It certainly was the best plan for him to pursue, as so very little is known, even in our day, about nervous action.

"We know that, by the inflammatory destruction of a number of sensitive nerve-fibres in the capsule of the joint,

at once three spheres are involved: the motor, for there is paresis or paralysis; the sensory, for there is pain; and the vaso-motor or trophic, for there is emaciation.

"So far as my insight goes, I am convinced that the living matter in a reticular arrangement produces the gray matter and all essential portions of nerves, including the axis-cylinder. This fact is thoroughly acknowledged by Professor Stricker, of Vienna.

"There may be a loss of living matter of certain nerves, in consequence of inflammation, and loss of contractility, with impaired conduction toward the centre. We then have comparative rest in a limited portion of the spinal cord, or even the brain, for the reticulum of living matter is set at rest for a time, without there being a material change in the living matter of the gray substance and ganglionic elements.

"If massage will re-establish the activity of the muscles, we are prepared to understand that the field in the spinal cord before out of action may at once be brought into motion, and the motion communicated at once to the motor ganglia and all the sympathetic centres which are situated along the spinal cord, as physiologists agree.

"The nervous action may for a certain time be impaired or dulled, because the reticulum of living matter is in comparative rest, lacking an impulse from without. So soon as such an impulse is carried to the resting portion, either by mental action, energetic will, or mechanical shock, as is done in massage, or in any other way, the contraction of the living reticulum is induced, and the normal condition re-established. Neither the assumption of centripetal neuritis, nor the theory of reflex action, can explain the phenomena observed after the inflammation of articulations and their occasional speedy cure."

Dr. HENRY L. TAYLOR said: "I can contribute a case, showing the beneficial effect of the use of the body battery:

"A woman, under the care of Dr. J. West Roosevelt, at the Roosevelt Hospital Dispensary, of middle age and neurotic personal and family history, presented among other symptoms that of

a prickling sensation down the right arm and in the right hand. There was no joint trouble. Dr. Roosevelt and myself regarded it as one of the neurotic disturbances incident to a person of her temperament. The body battery was tried for its psychical effect, and the woman returned in two days, with the abnormal sensations gone. The symptoms had lasted a considerable time. The same treatment was applied to the hand, without effect, during the week which she has since been under observation.

"I regard the result in this case as entirely due to mental influence.

"Before concluding my remarks, I wish to speak of an interesting class of cases alluded to by Dr. Gibney—the pseudarthroses. We have in these cases nearly or quite all the symptoms enumerated by Dr. Jacoby in his paper—atrophy, hyperæsthesia, or anæsthesia, etc., following mental restraint, there being no affections of the joints. I regard the trouble as functional and seated mainly in the brain, and not in the spinal cord, as Dr. Gibney believes, if I understand him. Almost any thing calculated to make a profound impression on the higher nerve-centres will often prove curative in these cases. This is, in my opinion, one of the most important effects of massage.

"I have in mind three cases of ankle trouble following sprains, seen three to five months after the injury. The acute symptoms had subsided, but pain, tenderness, and such impaired function as to cause limping persisted. These patients had been treated with supports, etc., for several months. Physical examination showed no local trouble not readily explained by mental inhibition. There had been recovery from the sprain, without a corresponding readjustment of the nerve-centres to the new condition. The patients were perfectly and rapidly cured by psychical treatment. I do not doubt that massage often accomplishes the same result through its psychical effects in similar cases, but it is an empirical method, as generally employed."

Dr. HENRY J. GARRIGUES said: "What little experience I have had with massage is in its favor, but that is almost nothing compared with that of Dr. Taylor. Nevertheless, I have used massage for ten or twelve years. I be-

came acquainted with it when it was quite new, and have found it most excellent for secondary conditions and for the affection to which Dr. Jacoby alludes."

The PRESIDENT said: "I will say a few words upon the subject of the continuous body battery and its use; the battery consists of a simple pair of elements. I well recollect a case in which I used this with good effect. A gentleman came to me with chronic arthritis. Associated with it was paralysis of the extensor group of muscles; the foot was dropped and the toe dragged; he said that no form of electricity that he had tried had done him any good. I told him I would give him a battery which he could wear all the time, which consisted of pieces of silver and zinc connected by copper wire. The zinc was shifted about upon different parts of the body, and a constant current was kept up, which could be tested at any time with ordinary litmus paper. While he was under alkaline treatment the battery worked with better results, the excretions being saline.

"This battery is also useful in the treatment of chronic ulcers. The granulations formed will be found more healthy. It is also beneficial in chronic eczema."

This much he would add to the practical part of the paper, since the main question, after all, was as to treatment.

Dr. V. P. GIBNEY said at times it was very difficult to determine whether the atrophy preceded or followed joint disease. It was his opinion that it was more frequently the accompaniment of epiphyseal disease than of joint disease proper, and he wished to emphasize the fact—for a fact it was, according to his observations—that the majority of grave lesions about joints in childhood were epiphyseal—in other words chronic epiphysitis.

Synovial disease he believed to be rare. If one examined a hip, for instance, said to be the subject of disease, marked atrophy was usually found in the thigh and calf muscles long before any pronounced joint symptoms were present. The atrophy, he further stated, was confined to the muscles and not to the bony tissue, for it was a rule that in chronic epiphysitis, about the knee for instance, the epiphysis was

actually elongated. He, in common with many other orthopædists, had long regarded acute atrophy as one of the most constant signs of chronic articular osteitis, and he believed the atrophy to be purely reflex and not the result of disease, or of the pressure from apparatus or bandages.

One argument brought against mechanical treatment—viz., that atrophy was produced—was fallacious. The clinical history proved this conclusively. He was not sure whether chronic synovitis induced atrophy, but he was positive that in acute synovitis atrophy was rather the exception than the rule.

A class of cases presented certain neuroses which were very valuable in excluding bone or joint disease. They were known as spinal pseudo-arthropathy, and known, furthermore, as neuroses of the joint, neuro-mimosis, hysterical joint, Brodie joint, etc. The neuroses referred to were neuralgia, hyperæsthesia, anæsthesia, but rarely any atrophy. He believed that they had their origin in the spinal cord and the meninges, and the readiness with which they responded to treatment confirmed him in his belief.

Furthermore, the neuralgia of chronic articular osteitis of the hip was well known, and the knee branch of the obturator never was affected early, and very often late in the disease, although this was denied by some writers, and especially a recent writer, Dr. Clippingdale.

In some of the most advanced cases of caries of the hip this obturator neuralgia was very distressing. Very frequently the sciatic nerve was involved, and in some cases the sciatica was most intense, and yielded to treatment with great difficulty.

The theory of paralysis and degenerative nerve changes being sequences of chronic arthritis was one about which he did not feel fully convinced. He referred to a case of chronic arthritis of the knee in an old woman who had paralysis of most of the muscles of the thigh and leg, in which it was thought by some who saw the case that the paralysis was dependent on the joint lesions, but the proof was not by any means conclusive.

Dr. JACOB said: "The first point to which I desire to

reply is that brought forward by Dr. Taylor. He said that he believed these nervous changes, particularly the paralysis and atrophy, were produced by psychical or mental influence, and that they might be relieved by attention to this point. I am at considerable variance with him as regards the effect that mental influence has in the production of these disturbances. I, for my part, can not understand how mental uneasiness can produce an atrophy, which is easily diagnosticated with the tape, of a certain muscle, and that in the short space of three days. But, as the doctor has promised us a paper upon this subject, perhaps that will succeed in convincing me.

“As regards the opposition which the massage treatment has received, I expected it would receive more. Massage has, especially in the United States, been very much in the hands of non-professional men, and, consequently, has been greatly abused and misapplied, but I hardly think there can be any question as to its efficacy in suitable cases and when properly applied.

“The theory advanced by Dr. Heitzman is very similar to that of Professor Charcot, who, as I mentioned in the paper, believes that certain parts of the cord are in a state of inertia or stupor.”

Reviews and Bibliographical Notices.

Diseases of Children. MEIGS and PEPPER. Philadelphia : P. Blakiston, Son, & Co., 1883. Seventh edition.

During the past few years much study has been given by the profession in the direction of purely physical signs of disease. As a result of this activity many obscure symptoms are now satisfactorily interpreted and instruments of precision multiplied. While doubtless there is a tendency to unduly exaggerate the importance of physical over rational diagnosis, yet in the study of diseases of early life the benefits of this mode of study are apparent. In adults the subjective signs must be carefully considered before making a diagnosis ; in young children they amount to nothing. Even the physical signs differ somewhat, and a careful consideration of the best methods of studying them should form an introduction to a work on diseases of childhood. This the authors have given in an essay on the clinical examination of children. The countenance, sleep, cry, general appearance of the infant, pulse and respiration, together with the best methods of examination, are all considered and form an admirable beginning to the body of the work. A careful review of this section will repay the student, as it is only by a thoughtful study of what may appear minor parts that a correct diagnosis in a young infant is reached. Thus it is well to know that incessant and unappeasable crying, taking on almost an automatic character, is produced by earache, as that produced by hunger and thirst is paroxysmal and ceases when the child is appeased ; also as a point of practical interest, the regions of the face are noted that are apt to be affected by cerebral, thoracic, and abdominal disease,—in fact the chapter is full of valuable hints to the beginner, of which we simply cite these as instances. Passing on farther in the book we are surprised at the great amount of space devoted to the discussion

of pseudo-membranous laryngitis. Since diphtheria has become so universally endemic, with the frequent production of a false membrane in the larynx, physicians have first come to recognize that they could not differentiate between the old pseudo-membranous laryngitis and diphtheritic croup. Then as opportunities for the study of diphtheria have become larger, the majority of intelligent physicians have gradually advanced to the opinion that nearly all the cases of obstructive laryngitis now encountered are diphtheritic. The authors themselves state that anatomically and clinically it is impossible to separate the two affections, and produce conclusive evidence to prove their assertion. To quote their own words : " It is our decided opinion that the vast majority, at least, of the cases of so-called pseudo-membranous laryngitis, or membranous croup, are in reality instances of diphtheria." They then proceed to state, however, that in deference to the views of certain eminent authorities, names not stated, they must regard the identity of the two diseases as unsettled, and proceed to devote much more space to the subject of pseudo-membranous laryngitis than they do to the whole of diphtheria, of which it really should form a part. This is a very important subject and one that should be set before the student in the clearest manner possible. While such a disease as pseudo-membranous laryngitis may exist separate from diphtheria, it is probably extremely rare as compared with diphtheritic croup and cannot be diagnosed from it. It is needlessly confusing to devote such space to a disease that exists largely in theory while disposing of croupal diphtheria in two pages.

The subject of tracheotomy is admirably and exhaustively treated. We have not seen a better summary of the reasons given in favor of and against the operation.

The study of nervous diseases in children affords an interesting field of study. This is true because the nervous system sustains such a vital and intimate relation in early life to all the functions of the organism, and also because, generally speaking, the symptoms resulting from disturbances of the nerve-centres vary according to the age. The cause that produces a delirium in the adult will very likely induce convulsions in the child. It is a fact familiar to all practitioners that the rigors preceding a fever may be replaced by eclampsia in children. Indeed, the frequent occurrence of eclampsia in early life calls for a separate consideration of the subject. The authors use the old classification of essential, sympathetic, and symptomatic convulsions. Although

it is often impossible to differentiate these varieties clinically, and sometimes a single attack may be both symptomatic and sympathetic, yet it is undoubtedly the best division that can be made for a working basis.

The authors have given a serviceable account of the nature and treatment of eclampsia, although we think the latter could have been improved by emphasizing more the importance of bromide of potassium and chloral hydrate in controlling the convulsions, and leaving out the enumeration of such drugs as valerian, assa-fœtida, and oxide of zinc. The great importance of an understanding of the best treatment of eclampsia is shown by the statement of Dr. West that, within the first year, the deaths from convulsions constitute over seventy per cent. of the total mortality from diseases of the nervous system. One point we think should be considered at greater length, and that is the relation between ordinary eclampsia as it occurs in childhood and true epilepsy; two diseases that clinically, and probably anatomically, bear a close resemblance. A beginning of epilepsy in childhood does not always take the form of *petit mal*, and it is of vital importance in prognosis as well as in treatment that the form of the convulsive seizure be recognized. In many cases no confusion could possibly arise between these two diseases, but not infrequently instances will arise in which a close study is required to make a diagnosis, and we think the books should devote more attention to the subject. The chapter devoted to anterior polio-myelitis, a disease of frequent occurrence in infancy, is, we think, one of the best devoted to disorders of the nervous system. The authors bring out clearly the fact that at this period of life the spinal system is extremely impressible, and such a factor as dentition only acts indirectly by increasing the natural susceptibility of the spinal centres. We hear little now of dental paralysis, as no matter where the source of irritation, it is probably some material lesion of the spinal trunk, perhaps a simple congestion, that causes the paralysis.

Turning to the section of the book devoted to general diseases, we are struck by the meagre article on rickets, an exclusive disease of infancy or early childhood, and which in a work like this we should expect, if anywhere, would have special consideration, while small-pox, which does not differ in children and adults, is discussed quite at length. The article on epidemic-cerebro-spinal meningitis is ridiculously short. A disease that occurs so frequently in early years, and is of such interest to the practitioner

both on account of its great fatality and distressing sequelæ, merits more than nine pages in a cumbersome volume numbering over one thousand. Indeed, we think the fairest criticism that can be passed upon this work is that, besides being somewhat behind the times, it exhibits an utter want of evenness and correct proportion in dealing with diseases according to their importance. We have seldom seen a book that showed such a grievous lack of symmetry. The writers are extremely diffuse upon many subjects that do not call for much consideration, while certain interesting and important diseases of children are treated as if the authors were producing a treatise on old age. Rheumatism, scrofula, tuberculosis, congenital syphilis, and malarial disorders are only some examples of important diseases of early life that are merely touched upon briefly. We would willingly forego night terrors if we could learn a little more about cerebro-spinal fever. Again, in a work on children, such a subject as diseases of the skin should be touched upon only in a cursory or supplemental manner, in order to show their most common manifestations as distinguished from like affections in adults. In the present work they form a treatise of eighty-five closely printed pages.

Henoch, of Berlin, in the preface to his work on diseases of children, states that he does not consider it proper to burden the book with tiresome repetitions of matters that are treated in detail in all works on general pathology and surgery. As a result, the subject of his work is formed exclusively of those diseases of childhood that are distinguished from similar affections of adult life by a preponderating frequency or by peculiarities of symptomatology. He leaves out variola entirely, on the ground that it has become almost exceptional in children at the present time. If all writers on special subjects would be as particular, much wearisome pruning would be saved the general reader. We think the urgent call in medical literature is for more symmetry and brevity. As the science of medicine advances with such great rapidity in all directions, the medical man who would keep up with the times must look for a literature in which clearness and condensation are more conspicuous elements. In order to arrive at a few facts, too often we have to wade through pages of unproven theories, many of which have long since been abandoned. If we would consult as to the management of a case, we have to face other pages in which the legends of past treatments are recounted faithfully and at length, before arriving at the present and improved methods. When we have occasion to consult some medical authors, we feel

toward them like Holofernes in "Love's Labor's Lost," who said of Don Adriano :

"He draweth out the thread of his verbosity
Finer than the staple of his argument."

HENRY D. CHAPIN, M.D.

Transactions of the Pennsylvania State Medical Society. Volume xv. Philadelphia : Collins, printer, 1883.

The present volume contains the proceedings of the meeting of the State Medical Society of Pennsylvania, held at Norristown, May 9, 10, 11, 1883. The first of the contents of this volume coming within the purview of this JOURNAL is the address on mental disorders by Dr. CURWEN of Warren. As might be expected from the occasion calling it forth it has of necessity a semi-popular character and cannot therefore with *justice* be submitted to strict criticism. He takes up at first the etiology of insanity and discusses this in a plain, practical manner, dealing specially with the mental condition of the mother during pregnancy in relation to "its influence on the fœtus." Dr. Curwen clearly disagrees with the gentlemen who with one accord at the trial of Guiteau declared that neither disease nor mental traits could be transmitted, for he says (p. 114) : "Certain facts may be considered settled by the general observation of the profession, that tendencies to disease and, in many cases, the actual disease itself, may be transmitted from parent to child, and this tendency may be traced back through one or two generations ; that peculiarities of temper, inclinations to special pursuits, anomalous mental and nervous states, singular views on given subjects not the effect of education but a direct result of a similar condition in one or the other parent, developed before any education was begun, and other matters out of the ordinary course, which can only be referred to some disordered or abnormal condition of the parents." Excellent advice, from a popular stand-point, is given as to education, and with this the address closes.

The paper on "Insane Asylums, in Some of their Relations to the Community" deals with the "liberation epidemics" which have of late afflicted the United States. By the term "liberation epidemics" is meant the manufacture of sane men out of lunatics ; dangerous to themselves and the community by virtue of the great writ of *habeas corpus*. Dr. CHASE, however, in the case of Dr. S. compromises with the popular view of that case, and thereby tends to arouse in the unprejudiced mind of an

impartial observer the suspicion that he is desirous of being on the popular and scientific side at the same time. Such language as this does not befit a scientific alienist: "His case seemed to be one of those greatly aggravated by home treatment and still not sufficiently severe to need immurement." The man either needed hospital or home treatment; if he needed hospital treatment no self-respecting medical superintendent of a hospital for the insane would speak of such treatment as "immurement." His remarks on the injustice of throwing obstacles in the way of the commitment of the insane are just, but contain nothing but what has been said a hundred times by non-asylum alienists.

The paper by Dr. AYRES has in nearly all its points been anticipated by papers emanating from members of the New York Neurological Society. One fundamental error vitiates the paper. Dr. Ayres fails to perceive that the management of a hospital for the insane is the prime therapeutic factor in the treatment of its patients; that this must be committed to *one medical* man. To turn the finance, the gardening, etc. over to a layman independent of the superintendent, is to destroy the efficiency of the hospital. In cases where this has been done, as in the New York city institutions, when under charge of a warden, the comfort of the patients under a dishonest lay official is sacrificed to a greed for gain, and under an honest, to a desire for economy.

Dr. Ayres is, however, in the right as opposed to Dr. Kirkbride; the province of the physician should not be held secondary to the administrator. This fiction, diligently fostered by certain *doctrinaires*, has done much to support politicians in turning out efficient superintendents because they did not believe in scaling a State debt, and to encourage them in putting men in office who were destitute of knowledge of psychiatry because they gave fraudulent certificates of ill health to convict politicians suffering only from punishment for malfeasance in office. The remarks of Dr. Ayres on assistant physicians are in the main just. The indifference of assistants is a great evil; but, while the position of the superintendent is as insecure as it is at present, there will not be much change made in this respect, since the assistant physician will, as in the Indiana Hospital for the Insane, not to speak of others, intrigue against the superintendent for the latter's position; and "self-preservation is the first law of nature." The fault of this lies, in many cases, on the shoulders of the superintendent, who chooses men indifferent to psychiatry for fear of intrigues

by the scientific physician, and is deservedly punished by intrigues on the part of the indifferentist, who has nothing better to do. If consulting staffs be, as in the New York city hospitals, mainly composed of dilettante and medical politicians, they are useless ; if, as was the case at one time in the Cook County Hospital, they interfere with the discipline of the hospital, they are pernicious : neither a house nor a hospital divided against itself can stand. The remarks on gynæcological treatment are not as just as might be expected from the general tenor of Dr. Ayres' article. With the results of the rash gynæcological experiments in the New York city hospitals in remembrance, the "culpable" (*laissez aller*) policy of the superintendents has at least partial justification. The remarks on restraint are not judicious ; every thing is liable to abuse. To abolish a thing because of its liability to abuse is an argument justifying the disuse of medical treatment of insanity entirely. The means of prevention of cruelty proposed by Dr. Ayres are in active operation in every well-conducted hospital for the insane in the United States. This paper adds little to the practical resources of psychiatry. It shows very clearly, as did certain recent investigations in Kentucky, that the reform needed is not a reform of a system but of individuals. The transactions are well issued and well bound.

J. G. KIERNAN.

Report of Investigation of the Central Kentucky Lunatic Asylum, Louisville, Ky. Gilbert & Mallory Publishing Co., 1883.

This pamphlet seems to bring us back to the time when Bethlehem Hospital for the Insane was a slaughter-house, it being run entirely by the attendants; and to the days in the New York City Asylum for the Insane when the supervisor was more afraid of the attendants than he was of the patients. Miss Chevallier has given, very charitably, Dr. GALE credit for honesty in his intentions ; but, even assuming that he is honest in his intentions, he is an unfit person for the position of superintendent of a hospital for the insane. He is, to speak plainly, either mendacious or ignorant about the practices of his brother superintendents, and if, to be charitable, he be ignorant of these, how ignorant must he be of psychiatry elsewhere. It appears from this pamphlet (p. 76), that attendants duck patients at their option and without physicians being present, or (p. 79) under the direction of the supervisor only; that (p. 83) attendants *choke* patients.

Dr. Gale stated that in every hospital for the insane in the United States ducking is used as a punishment. When this statement was made in the *Americal Journal of Insanity*, Dr. Hurd, of the Michigan Hospital for the Insane, at Pontiac, indignantly denied that such was the case at the institution under his charge. No such punishment is in use to the writer's knowledge in a single State hospital for the insane in the United States, other than that of Dr. Gale. To be sure the writer must confess that Dr. Wickes Washburn testified to the New York Senate Committee, that when Assistant Superintendent of the New York City Asylum for the Insane he ordered a patient to be ducked with his clothes on, but even that was done only by a physician. The present writer believes, like Krafft-Ebing, that the *douche* as a therapeutic measure is useful in certain cases, but like all therapeutic measures should be employed only under the directions of a physician. This is also the opinion of Dr. C. H. Hughes, who says, *Alienist and Neurologist*, 1883: "The practice of ducking a patient for punishment is never justifiable, and if ever thought proper as a calmative of excitement it should never be relegated to any other person than a medical officer willing to take the responsibility for consequences." These are the words of one held in high esteem among superintendents of hospitals for the insane, who views the subject from the stand-point of a medical superintendent for the insane. With this preface a few citations may be made (p. 90). Miss Kate Monroe on the stand:

"Q. Those patients that were ducked by you, what were they ducked for?

"A. General meanness.

"Q. Those that you ducked, did you do it by consent of the doctors?

"A. We got permission of Mrs. Riley (the matron).

Fanny Davis (p. 94). "Q. Was this ducking done by the instructions of the superintendent?

"A. Yes, sir. He told us when we could not control them in another way to give them a bath.

Bad Paul on the stand (p. 71). "Q. Do you attendants give chloral without permission of the superintendent?

A. "*It used to be the rule* here, but it is not now.

Dr. R. H. Gale on the stand (p. 20). "Q. You say that in ducking, the real object was to purge the patient's system, and that it was given as a dose of medicine?

"A. I say that was part of the treatment, and sometimes it was resorted to as a *punishment* for the refractory.

"Q. How is this treatment regarded in other institutions?

"A. That question has been discussed between medical superintendents publicly and privately. I cannot give any reference to any publications at this time, but it has been frequently discussed at the meetings of the superintendents.

"Q. Have you attended these meetings?

"Yes; I have attended them ever since I have been in charge of the institution, and I have *yet to meet* the *first* man who disagreed with me in my ideas on that subject. I learn from attendants here who have worked in other institutions that it is the practice, but you can learn that from themselves."

With these citations the subject can be left to the judgment of the reader, but the writer hopes that such a condition of things as has been shown to exist in the Central Kentucky Lunatic Asylum may not be paralleled in any other institution.

J. G. KIERNAN.

La Folie Universelle et la Science Mentale. Par IVAN GOLOVINE. Paris: H. Lesoudier, 1881.

There remains among a certain class of the insane seemingly otherwise recovered, an irritability which amounts almost to a logical perversion. To the class of individuals so afflicted belongs, to all appearance, the author of these pamphlets, and on careful perusal of them a pretty accurate diagnosis of the author's mental condition might be made. One of these pamphlets is headed "*Pathologiæ Psychique.*" In it are to be found statements like this: "When any one is stupid, says M. Rochefort, they remain so for a long time, and the asylum physicians are dry fruits, for the most part incapable of earning their bread in the city. Such is, however, the power of their association, that men in high places refuse to serve for fear of putting themselves in the hands of the alienist physicians." . . . "This sequestromania will only end when the alienists are obliged to pay heavy damages for false imprisonment." In another, headed "*La Monomanie de Persécution,*" it is stated that "the Estoret crime has made everybody indignant, but when it is learned what occurs in the asylums which Europe envies France, the world will recoil with horror and fright." It may also be said that the author is far from coherent in his ideas. With such pamphlets filling the book-stands, it is scarcely astonishing that Dr. Foville should vent his indignation in some manner, and this he

seems to have done by denouncing the American Association for the Protection of the Insane, ignorant, in so doing, that he is denouncing more than one estimable superintendent. He cannot with justice hold that Association accountable for the productions of the author of the present pamphlets.

J. G. KIERNAN.

Infant Diet. By A. JACOBI, M.D. Revised, enlarged, and adapted to popular use by MARY PUTNAM JACOBI, M.D. New York : G. P. Putnam's Sons, 1875.

The subject of infant feeding is one of the most important questions that can come before the physician for settlement. It is likewise a most unsatisfactory problem to solve, as is shown by the fact that thousands of children die annually from diseases of malnutrition, the result of improper food. So many writers have dealt with this subject empirically that we are glad to note that the present author has approached the question from a physiological and philosophical stand-point. It is by this method, if ever, that we may hope eventually to arrive at more truth than we now possess in relation to this perplexing question.

H. D. C.

Editorial Department.

JURY TRIALS FOR THE INSANE.

THOUGH the subject is somewhat trite, still the bad results of the trial-by-jury system in the commitment of the insane are so well illustrated in a recent case occurring in Illinois that the same calls for comment here. The case as given in the *Chicago Times* is as follows: "Too much looking into books" was given as the cause of E. P's unfortunate condition of mind. Miss P. had been a teacher in the H. school, and too close application had upset her mental faculties. Her father said she had tried to hang herself and had jumped out of the window. When the poor girl was questioned by the Court she said: "Oh! I'm sick. I went into a dispensary and they gave me three great black pills. Queer things come into my room at night, and I tried to kill myself because my folks would not let me go to church. Why, niggers are trying to take my life all the time." As the patient spoke coherently, and said she did not want to go to a hospital for the insane, the jury disagreed as to her mental condition, but the judge, who often has to make up for the defects of the jury, continued the case for one week; during that week the girl almost starved herself to death in consequence of delusions about poisoned food. A second jury found her insane.

This case illustrates in a very decided manner the cruelties and dangers of the jury system, and the advantages of the system are by no means apparent. No right of challenge will secure good jurymen, and the art of "fixing juries" is one of the great accomplishments of unscrupulous members of the legal profession. Juries are composed of persons, as a rule, more venal than the most venal member of the medical profession; and even supposing the jury to be honest, the average juror has not a judicial

mind. He can not discriminate between permitted testimony and reliable evidence. Every thing stated in the court-room during the trial, and not unfrequently there is much hearsay evidence and applause uttered in the court-room, influences the jury. Time and again has it happened in Illinois that a man has had himself chosen as a juror to spite relatives of the insane by finding the alleged lunatic sane. But is there no ground for the public opinion that some safeguard for the safety of the same or those recovered from insanity is required? It cannot be denied that at least one person recovered from insanity has been detained too long in a hospital for the insane. The remedy for this and for supposedly improper commitments lies not in throwing obstacles in the way of the commitment of the insane, but in supervision of the inmates of hospitals for the insane. That this would be unobjectionable to superintendents who have the interests of their patients at heart is shown by the requests of more than one of these gentlemen for an advisory board to whom he can refer cases whose recovery requires, in his opinion, to be tested, and whose opinion would be final. These boards must, however, not be constituted, like some of the present boards, of one alienist sandwiched in with an unlimited quantity of medical politicians who neither know nor care any thing about psychiatry.

AMERICANO-PHILISM IN ENGLISH ALIENISTS.

THAT scientists should be scientists first and patriots second cannot be denied, still every American feels gratified on hearing that American scientific results are appreciated abroad. If such appreciation, however, have no proper foundation, gratification becomes disgust. English visitors to the United States have a great tendency to admire the scientific achievements of such Americans as have treated them with personal courtesy. Others, forgetting that the United States is a nation made up of communities the laws of which differ markedly, praise American legal procedure as being the quintessence of legal wisdom. Dr. Bucknill, for example, has recently shown astonishing tendencies in this direction. Deceived in respect to the amount of restraint used

in one American asylum, he became so enthusiastic over the pathological work done in that institution that he actually blamed Dr. Luys for not quoting from Mr. Deecke what the latter never wrote nor claimed to write: contributions to cerebral anatomy. Unthinking praise of non-existent American scientific labors throws a stigma on American scientific results of real value, and is, therefore, from an American nativistic stand-point, much to be deprecated. A recent eulogistic statement of Dr. Bucknill shows an ignorance of the status of American forensic psychiatry which is hardly credible. The following resolution was offered at the Metropolitan Counties' Branch of the British Medical Association: *Resolved*, "That persons charged with crime respecting whom there is any suspicion of insanity shall be examined, at the expense of the Treasury, by three medical men—namely, the prison surgeon, the superintendent of the asylum in the neighborhood, and a medical man of repute practising in the vicinity,—and their joint report handed to the counsel for the prosecution." Dr. Bucknill was not able to support the resolution. He thought the course pursued in the United States was preferable. What course does Dr. Bucknill mean? for that pursued differs not only in every State, but sometimes in the same State. In New York the question as to whether a prisoner is insane just before or at the time of trial may, at his counsel's option, be determined by a commission; in case this commission find him insane he is sent to a hospital for the insane, there to await recovery, whereupon he stands his trial. In California the insanity is tried as a special issue, and if the prisoner be found insane he is committed to a hospital for the insane, further and no legal proceedings occur. That one of these procedures may have been in Dr. Bucknill's mind is possible, but if so, why refer to them in such an indefinite manner? Certainly the procedures under which admitted lunatics have been hung in New Jersey and Kentucky were also adopted in the United States. If American legal procedures in psychiatric matters are worthy of praise at all, the praise would be most appreciated from those who are possessed of and exercise proper powers of discrimination.

Periscope.

a.—PHYSIOLOGY OF THE NERVOUS SYSTEM.

ASPHYXIA.—Dr. Alexander Harvey has pointed out some discrepancies in recent physiological statements about death by suffocation. The first of these discrepancies arises in relation to the state of the pulmonic capillaries at the moment of death. It is usually taught that in asphyxia the lungs are full of venous blood, whilst the pulmonic veins, left cavities of the heart, and the systemic arteries are empty of blood, whilst the pulmonic arteries, the right cavities of the heart, and systemic veins are full of blood. Dr. George Johnson maintains that the capillary vessels are quite empty or virtually quite empty, and the lungs anæmic and collapsed, the muscular arterioles playing the essential part. His theory is that the minute arteries of the body are furnished throughout with a delicate layer of muscular fibres laid circularly between the external and the internal lining coat, and that these muscular fibres are under the controlling influence of a system of nerves—the vaso-motor. When the access of air to the lungs is at once and completely excluded the blood is no longer arterialized, and continues to pass through the lungs, and is distributed to the system at large. When this blood meets the small systemic arteries, the vaso-motor nerves, finding that the blood is not of the right sort but venous, give intimation of the fact to the arterioles. These contract—exert their stop-cock action to such an extent as to impede the passage of blood through them.

Simultaneously with the contraction of the arterioles the systemic blood-pressure is augmented, with the result of causing the left cavities of the heart to dilate and become distended with blood, the distension being greater and more marked in the auricle because it is more distensible than the ventricle. The venous blood, although impeded in its course, returns to the right side of the heart, and, passing through it, reaches the small pulmonic arteries. Here a singular result follows. The pulmonic arterioles are accustomed to the presence of ordinary venous blood. They allow it to pass freely through the pulmonic arteries into the capillaries of the lungs. But after venous blood has once passed through the systemic capillaries and again reaches

them their vaso-motor nerves take alarm, advising the arterioles of impending danger, whereupon the arterioles exert their stop-cock action and contract, yet not as their systemic fellows do. Instead of merely impeding the upward flow of blood they gradually, yet rapidly, put a complete arrest to it. The passage of blood is blocked, and permanently blocked, none now gaining access into the pulmonic capillaries. Again, as before with the systemic, on the pulmonic arterioles thus contracting the pulmonic blood-pressure is raised, and the right cavities of the heart come to be dilated and distended with blood, the auricle standing out prominently as a tense round ball. It would thus appear that while venous blood is allowed to make one circuit as such through the lungs it is not allowed to make a second. That the pulmonic capillaries are so sensitive to the venous blood in question is remarkable.

The second of these discrepancies is as follows: in apnœa at the moment of death are the left cavities of the heart full or empty of blood? Dr. Fagge held that at the moment of death the left cavities of the heart are not only full of blood but gorged with it equally and alike with the right cavities, and that if in ordinary autopsies in the human subject the left auricle and ventricle are found comparatively empty whereas the right ones are distended, it is because the former unload themselves during the setting in of the rigor mortis. Dr. Johnson holds that at the moment of death the left cavities of the heart are empty. Dr. Harvey puts forth arguments to show that the left side of the heart is empty.—*Medical Times and Gazette*, 1883, Nos. 1744, 1745.

THE RELATIVE RAPIDITY OF THE TRANSMISSION OF VISUAL, AUDITIVE, AND TACTILE IMPRESSIONS.—This subject has been investigated by Dr. A. Bloch, in the laboratory of M. Marey. He divided his work into three distinct parts, each part comprising a comparison of two sensations. 1st. Hearing and touch; 2d. Hearing and vision; 3d. Vision and touch. In the first series of experiments the sound was produced by a plate of steel which struck at each turn of the cylinder against a pin fixed upon the instrument. The tactile irritation consisted in the rubbing of a finger by a thin piece of whalebone fastened to the cylinder. He found that tactile sensation transmitted from the finger of the hand took $\frac{1}{31}$ of a second longer than that transmitted by the auditory apparatus. Of the three physical sensations, that of vision is the most rapid; then comes that of sound, which is $\frac{1}{2}$ of a second longer than that of visual transmission; and that received by the hand—that is, tactile sensation—is $\frac{1}{31}$ of a second longer in transmission than that of vision.—*Gazette des hôpitaux*, No. 128, 1883.

THE MEDULLA OBLONGATA.—Dr. Coutin, of Bordeaux, reported the following symptoms, following a lesion of the medulla

oblongata by a knife. The lesion completely invaded the right posterior pyramid, and a little of the left posterior pyramid and the restiform bodies. The phenomena were as follows: An absolute insensibility on the side opposite the principal lesion—that is, the left side; motor paresis of the same side; and, finally, the abolition of the patellar reflex of this side. There was an escape of considerable cerebro-spinal fluid, which contained sugar but no albumen. The sensibility of the side of the face remained intact, except in the region of the chin. The temperature was 39° C. There was no modification of the respiration up to the moment of death.—*Gazette des hôpitaux*, No. 139, 1883.

THE INFLUENCE OF COFFEE UPON THE GASES OF THE BLOOD.—M. Conty has made researches upon this subject, and arrived at the conclusion that coffee diminishes the quantity of the gases in the blood, especially the amount of carbonic acid. The urea and the sugar in the urine increase.—*Gazette des hôpitaux*.—No. 139, 1883.

THE TIME OCCUPIED IN THE RESPIRATORY REFLEXES.—Dr. Max Joseph has made several experiments upon this subject. It results from the experiments of several observers that the degree of retardation which an irritation suffers in its course through a nerve-mass, shows the presence or absence of ganglionic apparatuses. When with an intact medulla oblongata, an artificial arrest of the respiration is produced by irritation of a sensory nerve, this is not caused by apnœa but by a reflex action. The question arises: Where does this reflex take place? Is it in the respiratory centres of the oblong medulla, or in the spinal centres, whose existence has been markedly called into prominence by Lagendorff? The time which is involved between the irritation of the cervical spinal cord, the roots of the phrenic, and a contraction of the diaphragm, he calls the “spinal latent period”; the time which ensues between the irritation of the medulla oblongata and respiration, the “bulbar latent period”; the time between the irritation of a spinal nerve and respiration, is the “reflex latent period,” first, with an intact medulla oblongata, and second, after an isolation of the spinal cord.

The “latent period of the vagus” is the time which ensues between an irritation of the vagus and the beginning of an inspiration. The animals used were young rabbits. When the spinal or reflex latency was measured, the medulla oblongata was divided at the level of the nib of the calamus from the spinal cord. To estimate the bulbar and vagus latency, a section was made above the *alæ cineræ* and the pneumogastrics divided. For purposes of irritation he used a constant current from six Daniell cells.

The spinal latency was found to be .0158”; the bulbar latency was .0427”; the reflex latency, after the removal of the medulla oblongata, was .0515”, whilst with intact medulla oblongata it was .046”.

He also varied the method of experimentation by applying a sponge wet with ammonia to the nose, so that an arrest of the respiration takes place, and then irritating the sciatic he found the reflex latency to be .0445". If the reflex latency was the same without the medulla oblongata being present, the place of the centre of respiration must be the same in both instances. It results from the above experiments that after isolation of the spinal cord as after high section of the medulla oblongata and by intact spinal cord and medulla, the reflex latency varies in regard to time. By the experiments with the isolated spinal cord the lesion might be supposed to increase the reflex time, but at no period was the time greater with the medulla oblongata attached than without it. Hence he concludes from these results that by irritation of a sensory nerve the sequential arrest of the respiration is not due to a centre in the medulla oblongata, but in the spinal cord. When he estimated the vagus latency he found it to be .1695", being three times as great as the reflex latency when the medulla oblongata was directly irritated, the latent period being .0427". From these facts he concludes that the irritation after the vagus is excited must travel through ganglionic centres, from cell to cell before it reaches the spinal respiration-centre.—*DuBois' Archiv*, 1883, sechstes Heft.

GOLTZ'S DOG AND FERRIER'S MONKEY.—At the International Medical Congress in 1881, Prof. Goltz exhibited a dog whose cortex lesions he believed were of such a nature and accompanied with such phenomena as to be destructive of the hypothesis of localization. Prof Ferrier also exhibited a monkey, which he believed proved the doctrine of localization.

The dog of Goltz exhibited the following phenomena: When he was let out he ran about here and there, wagging his tail. "The movements of the limbs are, as a rule, normal. The position of the eyes shows no deviation. When the eyes are moved, the eyes move in harmony. He has, however, lost the fixity of the eyes that a normal dog has. The animal can see, as he avoids objects in his path. He does not fear the sight of a whip. When a burning candle approaches his eye, he does not wink or move his head. He also hears, as he answers to calls, but does not run when ordered to. He smells. He can find meat; but cigar-smoke, which is disagreeable to dogs, he does not appear to mind. The sensibility of the skin is generally blunted, but there is no doubt but that he has sensibility everywhere. The animal possesses all his senses, but he does not understand impressions as an uninjured animal." He infers from this experiment and others:

1. That the cerebral cortex is the organ of the mind; that the removal of large pieces of each half of the cortex diminishes intelligence.

2. That it is not possible through destruction of a section of the cortex to cause paralysis of the muscle.

3. That it is also impossible by a destructive lesion of the cortex to cause a permanent loss of activity of the senses. The animal has all his senses. After the removal of large pieces of the cortex there ensues weakness of the perceptive faculties. The dog of Goltz was killed and examined by Drs. Langley and Klein. Their report is as follows :

The parts of the right brain have been reported on by Dr. J. W. Langley.

The parts of cortex injured were the suborbital lobe, the posterior lateral part of the preorean convolution ; in the fourth convolution, the dorsal surface of the anterior limb of the sigmoid gyrus except a small part of the mesial and of the lateral anterior regions, the posterior limb of the sigmoid gyrus except part of the mesial surface in front of the ansate fissure (possibly nearly the whole), the posterior third of the ento-lateral convolution, the posterior part of the supra-splenial convolution starting a little behind the posterior third of the ento-lateral fissure, the post-splenial convolution, the dorsal part of the posterior third of the splenial convolution ; of the third convolution, the coronal except a small piece at its anterior end, the ecto-lateral except a small mesial strip two to three millimetres wide from the ansate to the posterior third of the ento-lateral fissure ; the posterior supra-sylvian of the second convolution, probably the whole of the first convolution, the whole of the anterior composite convolution, a dorsal strip from the coronal to the anterior ecto-sylvian fissure, of the posterior composite convolution nearly all the posterior region, of the lateral region probably a dorsal strip. For the most part, the limits of the lesion coincide with the limits of complete removal of gray substance.

The left side of the brain of Goltz's dog was reported upon by Dr. Klein. The outline of the injured cortex starts a little behind the crucial sulcus, passes backward across the anterior end of what appears to be the ansate fissure, intersects the lateral fissure, and under a very oblique angle crosses the posterior end of the ento-lateral fissure, and having reached the mesial end of the posterior margin of the hemisphere curves round the latter. It then takes a forward course, crossing the ecto-lateral and the posterior supra-sylvian fissure. It then runs, still keeping a forward direction, across the posterior ecto-sylvian fissure, and just touches the dorsal end of the sylvian fissure. Crossing then the anterior ecto-sylvian fissure, it turns in an oblique direction mesially across the anterior supra-sylvian and the coronal fissure, and finally joins the place of starting. Thus the following convolutions appear involved in the injury : the middle part of the posterior sigmoid gyrus of the fourth or superior convolutions ; it comprises the greater part of the ento-lateral, the great portion of the posterior part of the post-splenial ; of the third or middle convolution it comprises the whole of the ecto-lateral and almost the whole of the posterior supra-sylvian and the posterior part of the coronal ; of the second or inferior convolution, it involves the

mesial portion of the posterior ecto-sylvian, the whole of the median ecto-sylvian, and a good bit of the anterior ecto-sylvian; of the first or sylvian convolution, it involves a small mesial portion of both the anterior and posterior sylvian. In addition to these convolutions, as it appears from vertical sections, the injury comprises part of the supra-splenial as well as the dorsal part of the posterior composite convolution.

Dr. Ferrier, at the same Congress, exhibited a monkey who had the motor zone of the left hemisphere destroyed seven months previously. There ensued complete motor hemiplegia of the right side. There was at the time no volitional motion of the right arm and leg. The animal in other respects is quite well; tactile sensibility is good. It had exaggerated tendon reflexes and diminished superficial reflexes. The right forearm is generally kept flexed, the thumb bent on the palm, and the fingers semi-flexed. The animal took pieces of food with the left hand. The brain of the monkey was given to Prof. Schäfer to examine and report upon. He found that the greater part of the two central convolutions and the adjoining parts of the frontal and parietal lobes on the left side of the brain had been removed. Underneath the lesion thus produced there had become formed by secondary processes in the medullary centre an excavation nearly conterminous with the superficial lesion and not involving the basal ganglia. The pyramidal tract connected with the left side of the brain has undergone the Wallerian degeneration throughout its whole extent. There existed an unexplained tract of degeneration in the left lateral column of the cervical cord.

The reporters, Drs. Klein, Langley, and Schäfer, make no comments upon these facts.—*Foster's Journal of Physiology*, vol. iv., Nos. 4 and 5.

THE ACTION OF HIGH ATMOSPHERIC PRESSURES.—Dr. E. De Cyon has recently studied this subject. The first series of experiments was made upon rabbits in a chamber whose pressure did not exceed two atmospheres. A large bag of oxygen was in communication with the trachea of the animal. A registering apparatus and a mercurial manometer were inside the apparatus, as was the observer.

The increase of pressure was made slowly, as was the decrease of it. In the first experiments, made with the compression of two atmospheres of ordinary air to modify the vaso-motor system in a manner to allow any conclusion as to the increased oxygenation of the blood, the mercurial manometer did not show any change in the vascular system under the two atmospheres, from normal. Direct inspection of the animal showed that as the pressure increased there was a narrowing of the capillaries visible to the eye, the skin and mucous membranes became pale, the ear became exsanguinated. At first sight this retirement of the blood from the periphery to the cavities of the body seemed to be due to variations in the nervo-vascular system. The question then arose

how to harmonize such a variation in the *nervo-vascular* system with the constancy of the arterial pressure. It was found that this narrowing of the vascular system was only peripheral, and due to mechanical causes.

The vessels of the cavities of the body compensate for the peripheral narrowing by a slight dilatation, and thus preserve the equilibrium. Compensations of this nature are very frequent in the vascular system. This experience suggests why there are extravasations of blood in the bones of the cranium, the envelopes of the brain, and perhaps in the brain itself. These extravasations are due to special conditions of the circulation in the cranium itself; the equilibrium of blood-pressure is not able to be promptly established so as to prevent rupture of the vessels, where high barometric pressures are used. These effusions explain the convulsions and paralysis, which have been asserted by M. Bert to be due to changes in the gases of the blood. When with two atmospheres oxygen is substituted for the ordinary air breathed by the rabbit, then only does the mercurial manometer indicate changes in the arterial tension, with changes of cardiac rhythm. The blood-pressure falls to fifty millimetres, the beats of the heart become more frequent, respiration is slowed. But the arterial tension returns to 100 millimetres. To explain these phenomena it is necessary to assume pressure on the peripheral vessels of the body. As to influence of the high pressure on the heart, the diminution of the tension of CO_2 enfeebles the moderating nerves, whilst the increased tension of oxygen excites the accelerators, hence the heart is accelerated.

He also found that with a rabbit breathing oxygen under a pressure of two atmospheres, irritation of a sensory nerve caused a fall instead of a rise in pressure. He then used dogs breathing ordinary air with the artery communicating with a mercurial manometer outside of the apparatus. The highest pressure used was three atmospheres.

The arterial tension at one atmosphere, commenced to fall till the pressure was two atmospheres, when it again mounted to about normal. At three atmospheres the pressure is diminished one half. The cardiac pulsations are less constant in their variations; they slowly increase. The respirations at two atmospheres diminish a little; beyond two, on the contrary, they become very few. He then tried the animal breathing oxygen, and found that the general character of the modifications in the circulation were about the same as when ordinary air was used, only they are more marked. The diminution of pressure is ten millimetres, as it is after section below the medulla oblongata; the frequency of the heart is nearly double, and the respiratory movements are few. The explanation of these changes does not present any difficulty. The tension of the carbonic acid, the principal excitant of the vaso-motor and respiratory centre, is diminished, the arterial tension necessarily falls, and the respiration is arrested. The cardiac

frequency is increased for the same reason. Hence, when at a pressure of $2\frac{1}{2}$ to $2\frac{3}{4}$ atmospheres, the animal really breathes oxygen (and not a mixture of carbonic acid, oxygen, and nitrogen, as in the experiments of M. Bert), circulation becomes nearly impossible, and respiration nearly ceases, and this happens for reasons uniquely dependent on the oxygen and carbonic acid, upon the nervous centres presiding over these two vital functions. Of the toxic action of oxygen as held by M. Bert, there is no trace.—Supplement-Band, *Festschrift für E. Du Bois-Reymond*, October, 1883,

PSEUDO-MOTOR ACTION OF THE NERVES.—Prof. Heidenhain has made a series of experiments upon this subject. Over twenty years ago Philippeaux and Vulpian found in dogs that when all the roots of the hypoglossal were torn out of the skull, and after a few months, the usual motorial, inactive, lingual branch of the fifth pair by mechanical irritation caused movements in the paralyzed half of the tongue. Vulpian found that the nerve involved here did not come from the fifth pair, but from the chorda tympani.

Prof. Heidenhain's observations were made upon dogs whose left hypoglossus had been previously cut. The animal was placed upon his back, so that the under surface of the tongue was exposed to a large extent. The lingual nerve of the paralyzed side and the hypoglossal of the sound side, and very often the lingual of that side, were exposed in such a manner that, after previous division, irritation of its peripheral end could be made without danger of spreading of the current.

The tongue on the paralyzed side showed the fibrillary contractions; the primitive muscular bundles appear, independently of each other, in continuous movement like those seen in the cilia. His observations began with the fourth day after the division of the hypoglossus, and the movements increased to the end of the third week. After this they became weaker, and did not disappear till the sixth week. He saw in some cases, after irritation of the about lingual nerve, a small part of the tongue, through its longitudinal fibres, contracting; but usually there was no result. He considered this exceptional muscular contraction to be due to fibres coming into the lingual from the hypoglossal. When he irritated the lingual three weeks after a section of the hypoglossus, the muscular glimmer increased, or, if not present, the irritation caused it to appear. If the irritation is increased there is an increased rapidity of the muscular glimmer and a superficial bending of the left side of the tongue. The contraction caused by lingual irritation is different from that caused by hypoglossal irritation. It begins slowly at the base, and very gradually with increasing intensity reaches the tip of the tongue. These phenomena were accompanied by vaso-dilatation. Heidenhain also believes that the motor action of the lingual is due to the chorda tympani. The reaction-time of the hypoglossus is .015-.020 of a

second ; the reaction-time of the lingual is .08, which is the quickest time he noted (usually it is considerable more) The strength of the contraction caused by irritation of the hypoglossus is at least six times as strong as that caused by irritation of the lingual. Chemical irritation of the lingual had hardly any effect. During the excitation by morphia, the muscular glimmer increases. The muscular waves can be called out by reflex action. With nicotin, in the first period there is considerable vascularity of the tongue and an increase of the fibrillary contractions ; in the second period they disappear, the tongue is less vascular ; in the third period irritation of lingual causes vaso-dilation but no muscular contraction ; in the fourth period lingual irritation causes muscular contraction as well as vaso-dilatation. If urari is injected till the hypoglossus has lost its action, then lingual irritation is without effect, but the spontaneous fibrillar contractions continue. Urari also prevents the primary irritation of nicotin on the tongue. In the normal state lingual irritation is without action, but after complete degeneration of the hypoglossus the nerve commences to act ; the muscle is not normal. The paralysis by nicotin and that of the chorda tympani go together, whilst urari prevents the irritation of nicotin and lingual irritation. The acceleration of the current of blood through the chorda tympani is not the immediate cause of the excitation of the muscle. The chorda, after separation and division of the hypoglossus, does not play the rôle of a motor nerve of the tongue, in the usual sense of the word, for the fibres are not in direct connection with the muscles of the tongue. The contraction caused by irritation of the chorda resembles that caused by irritation of a motor nerve going to an unstriped muscle. He is not able to give any satisfactory explanation of these facts.—Supplement-Band, *DuBois' Archiv*, 1883.

THE INFLUENCE OF THE FREQUENCY OF THE IRRITATIONS UPON THE GENERATION OF MUSCULAR FORCE.—This subject has been investigated by Prof. J. Bernstein.

He arrived at the conclusion, from numerous experiments, that at least up to fifty irritations in a second, the muscle-force evolved increases.—*DuBois' Archiv*, 1883.

RESPIRATORY INNERVATION.—Prof. Fredericq, of Liège, has studied this subject. He used rabbits and laid bare the medulla oblongata from behind, making an incision through the occipito-atloid membrane. By the application of small pieces of ice on the medulla the respiration becomes slower.

If the ice is removed and heat radiated to the oblong medulla the respirations increase. The rapidity of results after the application of heat or cold excludes the idea of the respiratory centre being in the spinal cord. If he cooled the medulla oblongata, and irritated the central end of the pneumogastric, the centres of inspiration are suppressed, and the fibres going to the centres of

expiration are in activity. The centres of inspiration are more sensitive to the cold than the centres of expiration.

Chloral has the effect of suppressing the action of the inspiratory fibres of the vagi, or rather of depressing the excitability of the centres in which they end. He also made experiments upon the effect of trigeminal irritation, by plunging the nose of a duck in water, a cannula being in the trachea. He found that respiration was arrested for a long time. The first movement that followed the arrest of respiration was not an inspiration, as is the case with the rabbit, but an active expiration which is followed by an inspiration. He believes this trigeminal sensitiveness to be a protecting agent to the nasal orifices against water.—*DuBois' Archiv*, 1883.

THE GASEOUS CHANGES IN FEVER.—Herr Lilienfeld has made with rabbits a series of experiments upon this point. His conclusions are as follows :

1. The formation of carbonic acid in fever is increased.
2. The amount of oxygen used is increased.
3. By the increase of both oxygen and carbonic acid in fever the respiratory quotient suffers no change.
4. The increase of gaseous changes is not a result of heightened temperature, but rather the cause. There must also simultaneously be a change in the regulation of the heat-dissipation, for it is well known that in healthy animals a large increase of the process of heat-production takes place, yet the temperature of the animal remains the same.
5. The regulation of the temperature of the body in fever continues. He arrives at the conclusion that in fever there is an increased innervation of the muscles, an increase of the irritations normally sent to the muscles through the nerves. He thinks that it is difficult to understand how new ferments in the blood could preserve the unchanged relation of the oxygen to the carbonic acid.

What the cause is of the increased innervation, the exaggerated muscular tonus, remains undecided.—*Pflüger's Archiv*, Band 32, Heft. 4, 5, and 6.

ISAAC OTT, M.D.

b.—GENERAL PATHOLOGY OF THE NERVOUS SYSTEM.

Dr. M. Allen Starr, in an article entitled "THE VISUAL AREAS OF THE BRAIN, DETERMINED BY A STUDY OF HEMIANOPSIA" (*The American Journal of Medical Sciences*, Jan., 1884), publishes a collection of thirty-two cases, with carefully recorded autopsies, which confirm Munk's conclusions derived from seven years' experimentation on animals. Munk gives as a final statement of his work the following conclusions :

1. "Occipital lobes of the brain are necessary for the perception of visual impressions."

2. "Each occipital lobe is in functional relation with both eyes in such a manner that corresponding halves of both retinal areas are projected upon the lobe of the like-named side."

The peculiar symptoms of blindness in corresponding halves of both eyes, called "lateral homonymous hemianopsia," was long thought to be due in every case to a destruction of one optic tract. Prior to five years ago all the cases on record supported that conclusion, but since then numerous cases have been published that demonstrate that it may be also produced by a lesion of the pulvinar of one optic thalamus, or by a lesion of one occipital lobe, situated either in its white matter, which Wernicke has proved to be a tract connecting the optic thalamus with the lobe, or situated in its cortex.

The writer brings forward two groups of cases. In the first, which consists of five cases, there was hemianopsia with lesion of one optic thalamus. In the second, of twenty-seven cases, there were lesions of the optic lobes. He adds that cases of hemianopsia produced by lesions of one optic tract are so well known and so frequently reported that it is not necessary to give them. In eight of the cases cited hemianopsia was the only permanent brain symptom present. In one of these there was a lesion in the optic thalamus; in two in the occipital lobe and the thalamus; in the remainder it was confined to the occipital lobe. "These cases alone," says the author, "would prove the fact that the visual area of the brain is located in the occipital lobe." Consciousness is associated with cortical activity only; the thalamus is but a ganglion interposed in the course of the fibres of the cortex, and not the seat of the conscious perception of sight, which is in the occipital lobes.

In the other cases recorded, where other symptoms than hemianopsia were noted, such as hemiplegia, monoplegia, unilateral convulsions, and aphasia, there were other lesions present which would account for these; therefore the conclusion arrived at from pathological researches, that these symptoms belong to the occipital lobes, and only to them, and consequently to them must be referred the function of sight.

Dr. Roberts Bartholow publishes an interesting paper on ENTERIC PARAPLEGIA in the *Boston Medical and Surgical Journal*, Dec. 13, 1883. He defines the affection as a truly reflex spinal paralysis produced by intestinal disorder. He brings forward three cases occurring in men over sixty years of age, who were afflicted with obstinate enteric disease, accompanied with a manifestation of motor and sensory paraplegia, which disappeared when the intestinal disorders were gotten rid of.

These cases, with similar ones which are on record, lead Dr. Bartholow to the two following conclusions:

1. "That there is a reflex paraplegia due to the functional disturbance of the intestine,—enteric paraplegia."

2. "That there is a paraplegia having its initial seat in the end

organs of the nerves distributed to the mucous membrane, thence ascending to the cord by a progressive neuritis."

The mechanism of the first he would explain on a vaso-motor theory. Anæmia is a cause of paraplegia. A moderate degree of stimulation of the end organs of the sensory nerves, not too violent or long continued, stimulates the vaso-motor centre in the medulla and causes a general contraction of the arterioles, as an excessive and protracted irritation depresses the vaso-motor centre and relaxes the vessels. It seems probable that an ordinary intestinal indigestion and the stretching of the nerve fibres produced by retained gas is a degree of irritation sufficient to produce the former effect. The writer also supposes that the blood pressure in the vessels of the intra-abdominal organs rises and falls in an independent manner, controlled by the same ganglia that regulate the calibre of the intra-spinal blood-vessels.

To differentiate between the reflex paraplegia and that which is an ascending neuritis succeeding certain cases of enteric, renal, or genital disease, the following distinctions should be kept in mind: Reflex paraplegia is sudden in its onset or develops quickly; is soon complete in all its symptomatology; it follows the fortunes of the producing malady; is never fatal.

That renal and intestinal troubles should in one case result in reflex disturbances, and in another in an ascending neuritis, is due, the writer thinks, to two reasons:

1. The depth and extent of the peripheric lesions.
2. An inherent susceptibility to degenerative changes in the nervous elements.

THE PULMONARY PATHOLOGY OF GENERAL PARALYSIS.—Under this title, Dr. J. Crichton Browne advances the view that among the secondary degenerations of general paralysis, those that affect the lungs are not the least conspicuous and important. In a large majority of cases of this disease where autopsies are performed, coarse changes in pulmonary structure are plainly visible, and in many instances these are of a character which indicates that they have interrupted and forestalled the progress of the cerebral disorder. In Dr. Browne's observations, made on the bodies of one hundred patients who died at West Riding Institution of general paralysis from 1872 to 1875, by far the larger number were carried off by an intercurrent disease of the respiratory organs.

1. He found a difference in the *weight of the lungs* in general paralytics. In males this amounted to an average of an ounce and three quarters in the right lung and an ounce and a half in the left. He regards this as analogous to that which takes place in senile atrophy,—a general failure in nutrition. Locomotion and vocalization are interfered with. Failure of heart's action, weak inspiratory power, diminution of the capacity of the chest are factors which account for the change of consistence found in the lungs after death. They are "of a pale color, of dry texture, and

less firm and resisting than they ought to be, having lost their elastic resilience, so that they are capable of being squeezed into a small compass. The air vesicles are of large size, and the bronchi look as if thinned."

2. *Changes in the pleuræ.* In persons afflicted with general paralysis these serous membranes are more prone to abnormal conditions than amongst mankind generally. Of the one hundred cases, seventy-four had pathological changes of one kind or another. This proclivity to inflammation of the pleural membrane may be due to the extension of this disease from the lung; also exposure and the over-exercise of the lungs, since the general paralytics often shout incessantly for hours together, and even for days and nights, with a persistency that the most inveterate orator never attains to.

3. *Congestion of the lungs.* This is the most common pathological change, occurring in forty-nine out of one hundred cases. It is hypostatic in character, and is almost invariably most marked posteriorly and in the lower lobe. This condition is due in the majority of cases to the decubitus; and the practical lesson of looking out that the position of the helpless paralytics is changed to avoid this, is deduced, and also a strong argument against mechanical restraint.

4. *Pneumonia.* This occurred in thirteen out of the one hundred cases. As an explanation of the great prevalence of pneumonia in general paralytics, he brings forth the experiments of Traube and Steiner, who demonstrated that section of the vagus or of its recurrent laryngeal branches produced inflammation of the lungs. Besides the mechanical irritation which, in those cases where there is more or less paralysis of the œsophagus and larynx, may arise from bits of food or saliva entering the bronchi, there must be some centric nervous influence at work causing neuropathic hyperæmia.

5. *Phthisis.* Phthisical consolidation or disintegration of the lung tissue occurred in twenty-five out of the one hundred cases analyzed. Excluding the question of heredity, which, as a general thing, can be done in these patients, there are attending circumstances in their general debility and loss of power, and the fact that they are crowded together in wards which are liable to be contaminated with the breath and sputum of phthisical patients, which would account for its prevalence.

In two cases of the one hundred abscess of the lung occurred.

Dr. Mickle has seen gangrene of the lung in general paralysis; but nothing approaching it was observed in any of the one hundred cases analyzed by Dr. Browne.—*Brain*, Oct., 1883.

SCIATIC NEURITIS IN PHTHISIS.—At M. Landouzy's clinic at *la Charité* there appeared a woman, thirty-three years old, emaciated, complaining of loss of appetite, of a cough, of pain in her chest, and spitting of blood. There was atrophy of the right lower extremity, mensuration showing a difference of two centimetres

in the circumference of the leg and three centimetres in the circumference of the thigh. The skin was thickened, also the subcutaneous tissue, so that the atrophy was muscular. She said she had suffered constantly for eighteen months from that member whether quiet or walking, and night as well as day. She showed pain at the point of emergence of the sciatic nerve, in the length of its course, and in the principal branches.

On examination of the lungs bronchitis at apex of the right lung and tubercular infiltration of considerable extent were found. In the left lung, a suspicion of tuberculosis. The family history showed nothing to indicate a predisposition to phthisis. One husband had died of phthisis, and her present husband is a victim of tuberculosis.

M. Landouzy made the diagnosis of sciatic neuritis of phthisis.

The observations of M. Peters and M. Friot lead one to think that sciatic neuritis can begin the series of accidents of phthisis, or declare itself in the course of pulmonary tuberculosis. In these circumstances the sciatic pains may be intermittent as in neuralgia, are always persistent, and are very rebellious. Their appearance awakens the suspicion of a tuberculous alteration—it may be in the cord, it may be in the meninges, it may be in the vertebral column. They commence with the aggravation of the disease, and generally precede a little the sad termination.—*Gazette des hôpitaux*, Nov. 10, 1883.

SUBACUTE ANTERIOR GENERAL SPINAL PARALYSIS.—In the *Revue de Médecine* MM. Landouzy and Dejerine have two long and comprehensive articles concerning general spinal paralysis of rapid course, and yet curable, to which they give the name of subacute anterior general spinal paralysis, of which, up to the present time, precise anatomic-pathological data, which have been so closely made out in acute myelitis of the anterior horns, are wanting. They undertake to show in the paper under discussion that there exists a clinical form of general spinal paralysis of the anterior horns progressing rapidly, developing and terminating in several months, with a complete recovery from all the paralytic and atrophic symptoms. Their deductions are based on two cases. One a hospital patient, who, having recovered from the paralysis, succumbed to acute miliary tuberculosis, which afforded the gentlemen an opportunity to establish the pathology of the disease. This case presented the following particulars :

OBS. 1.—Paralysis and atrophy extremely pronounced and general in all the muscles of the body except those of the face. Old deformity of left limb depending on an infantile paralysis. Abolition of tendon reflex in all the affected muscles, degenerative reaction, marked exaggeration of the idio-muscular contractility. Integrity of the general and spinal sensibility, also of the cutaneous reflexes; integrity of the skin and the sphincters. Duration of illness, ten months. Complete cure of paralysis and atrophy;

persistence of absence of the patellar reflex; death by miliary tuberculosis.

Autopsy.—Ancient lesion of infantile paralysis in the left lumbar enlargement; trifling alterations, and probably of recent date, of the gray substance of the anterior horns in the rest of the cord; integrity of the anterior and posterior roots and of the intra-muscular nerves; multiplications and pigmentation of the protoplasm of the nuclei of the primitive muscular fibres.

OBS. 2.—Paralysis and atrophy of all the muscles of the body, having commenced by a temporary paralysis of the left facial; abolition of patellar reflex; alterations of faradic contractility; integrity of sensibility of the sphincters, and the nutrition of the skin; rapid progress of the paralysis and atrophy. Duration of disease, seven months. Cure complete and definite for four years.

These two cases are presented as types of this disease, which is little known and which has been little described. Frey gives an analogous case, under the name of temporary paralysis of the adult similar to infantile paralysis. Duchenne has also described it, as has Eisenlohr, Goldammer, and Lincoln.

From the facts the following conclusions are deduced:

1. There is a myelopathy characterized by:

(a) Paralysis and atrophy of all the muscles of the body (those of the face excepted).

(b) The integrity of sensibility and of the sphincters.

(c) The integrity of the cutaneous nutrition.

(d) A rapid development (few months).

(e) Cure complete and definite of all the paralytic and atrophic troubles.

2. This affection to which we propose the name of *paralysie générale spinale à marche rapide et curable*, is to the acute spinal paralysis of the adult that which the general subacute spinal paralysis of Duchenne is to progressive muscular atrophy.

3. This disease depends on a lesion of the cells of the anterior horns of the cord, lesion situated in its whole length.

4. If the seat of the lesion is demonstrated by the pathological anatomy, its nature remains to be determined.

5. The etiology as well as the pathology remains exceedingly obscure.

6. The recognition of this form of myelopathy presents an important practical interest, since upon its differentiation depends a favorable prognosis, where at first the intensity and distribution of the paralytic and atrophic changes would lead one to dread a progressive incurable affection.

Dr. G. P. PUTNAM for W. R. BIRDSALL, M.D.

c.—MENTAL PATHOLOGY.

DISCHARGE OF INSANE PATIENTS.—Dr. J. C. SPRAY, Superintendent of the Cook County Hospital for the Insane (Report for 1882), raises an issue not unworthy the attention of superintend-

ents of hospitals for the insane. The course recommended would tend to diminish the outcry about the incarceration of "sane" individuals: "The responsibility of passing upon the mental condition of these people leaving the hospital rests upon the superintendent alone. There is no one to share the burden, and when it is remembered that, in a legal sense, these persons, after having been once pronounced insane by the Court, remain so until the verdict of insanity is set aside by the same authority, and that Cook County is more or less liable for their acts from that time on, so long as the finding of the Court hangs over them, it must be seen that the responsibility imposed upon the superintendent is, in fact, too great to be borne by one person, for in every case passed upon by him as being able to leave the asylum, the question of the welfare to life and property is involved. Though not one accident has occurred so far as known, it is plain that the responsibility involved in the discharge of patients should be divided. The law should be so changed as to provide for a lunacy commission, to which all cases considered by the superintendent able to live outside the asylum with safety, should be referred, the decision of such commission to be laid before the Judge of the County or Circuit Court, who may or may not set aside the verdict of insanity, thereby freeing the county from any further responsibility for the acts of the person in question. This is a subject of no small importance, and should receive serious consideration."

PARETIC DEMENTIA IN THE FEMALE.—Dr. S. V. CLEVINGER, Special Pathologist of the Cook County Hospital for the Insane (*Alienist and Neurologist*, January, 1884), in discussing this subject, says, that the frequency of parietic dementia among women, compared with its occurrence among men, as given by various investigators, is as follows: Bayle, 1 to 8; Calmeil, 1 to 4; Hoffman, 1 to 8; Duchek, 1 to 9; Esquirol, 1 to 8; Parchappe, 1 to 5; Laségue, 2 to 9; Foville, 2 to 7; Falret, 1 to 6; Bucknill, 4 to 13; Boyd, 2 to 9; Griesinger, 1 to 10; Griesinger at Prague, and Stephansfield, 1 to 4; Luys (higher classes only), 1 to 12; Marce, 2 to 25; Krafft-Ebing, 1 to 8; Lange, 1 to 13; Jung, 2 to 7; Riva, 2 to 9; Tamburin, 2 to 9; Buccola, 1 to 5; Regis, 1 to 6; Mickle, 1 to 6; Kiernan, 1 to 6; Shew, 1 to 42; Cowles, 1 to 30; Stearns, 1 to 7; Fisher, 1 to 5; Spitzka (private patients), 1 to 58; Schüle, 4 to 10; J. P. Gray, 1 to 8; Voisin, 1 to 8; Mendel, 1 to 10; Sander, 1 to 12; Austin, 1 to 14; Clouston, 2 to 11; Seppilli, 1 to 3; Verga, 1 to 3; Burman, 1 to 4; Shepard, 1 to 5; Lalor, 1 to 18; Björnstrom, 1 to 7. The average proportion calculated from these thirty-nine authorities is about one to eight. Fuller reports from European and American Asylums would doubtless show a different ratio. Neumann, from not having seen a single case, denied the existence of parietic dementia among females. Dr. Clevenger found the proportion in his institution to be about two to seven. He

reports the case of a thirty-seven-year-old Irishwoman, married; very marked intemperance before insanity was noticed by friends. Father died of "consumption of the bowels"; mother died at sixty, paralyzed; had never borne children, nor menstruated; hereditary predisposition denied. October, 1881, furor appeared and lasted three weeks. She remained at a hospital in Chicago till this abated, when a remission occurred, lasting till December 25, 1881; when she had "cramps," lasting a week. She was sent to "Michigan State Retreat," where she remained until July, 1882. Little known about the last remission, except that she was errabund. The first remission is stated to have been complete. Just prior to coming under Dr. C.'s observation, delusions of persecution were observed. Patient exhibited marked parietic symptoms, tremulous oral and lingual muscles, from admission. She had speech drawling, tremulous tongue, and felt extremely well and self-satisfied; had unsystematized delusions of grandeur; gave little or no trouble. August 30, 1883, hemiplegia followed a convulsion, and she died next day without coming back from stupor. Autopsy eight hours after death: Uterus very small, resembling that of a girl of sixteen; left ovary, atrophied; os tincae, imperforate; vagina patulous and large. A third nipple well developed below left breast. The brain weighed 39 oz. after preparation in solutions for microscopical examination; hence, weights here given have only relative value. Cerebellum weighed $4\frac{3}{4}$ oz. Each hemisphere weighed within a few grains of $16\frac{3}{8}$ oz.; the left side, then, can be considered under weight. Cholestrin, abundant, especially in occipito-basilar regions. Right antero-posterior diameter of medulla slightly less than left. Isthmus weighed an ounce. Vermis of cerebellum warped toward left side, causing left aspect of the organ to appear larger than that of the right. Cortex did not pull, with pia, loose from medullary substance—(noted in some cases by Spitzka). In many parts of parietal and occipital regions, the pial adhesions were sufficient to bring away the outer layers of cortex, imparting the ragged, ulcerated appearance to which Rindfleisch called attention. Heterotopia found in anterior parietal region. Cortical pial adhesions occurred in the lowest extremity of right occipital lobe, with connective-tissue proliferations filling widened sulci. This condition was extreme at base of first frontal convolutions on both sides; fibrous trabeculae, clubbed and twisted, extending downward from pia covering four to five square inches, filling interstices left by shrunken gyri and atrophied gray substance. In the white substance, external to the right lobulus cuneus, a cone-shaped area of yellow softening, with apex curved forward was found, measuring one inch in length, tapering from three lines in diameter. It was apparently the colloidal necrobiosis of a thrombosed terminal branch of the posterior cerebral artery. The gelatinous contents of the cone were mixed with detritus of the degenerated blood-vessel. Sections microscopically examined afforded views of kinked and dis-

torted vascular channels often twisted glomerularly. Knobbed vessels were frequent, and knobbed perivascular spaces more so; some clear, others dotted with granular masses. Evidences of capillary stasis, general and decided, while dark bodies, resembling embryo connective-tissue corpuscles, abounded. No well-defined Meynert "spider-shaped cells" were discovered. The ganglionic elements were shrunk and their processes illy defined; a few large nerve-cells with granule contents were observed lying in clear spaces, as though contracted from areas they once filled. Sclerosed patches abounded in the sections examined. With the exception of the lesions in the bregmatic region, the post-Rolandic parts were mainly involved. The ventricular endyma was nodulated in parts, affording Spitzka's "ground-glass" appearance. Comparatively few healthy ganglionic bodies were discerned in over a hundred sections taken from different parts of the cerebrum. It was obvious from the teratological findings, that the case was an impure one; either original imbecility or primary monomania complicated by paretic dementia, and history subsequently obtained showed that the patient was a case of moral imbecility prior to becoming a paretic dement.

INSANITY FROM SIMULATION.—Dr. KOSTER (*Irrenfreund*, No. 10, 1883), has reported the case of a somewhat hereditarily defective man who simulated insanity, with religious ideas predominating, to avoid military service, but from the mental strain of the simulation, became insane.

INSANE CRIMINALS.—Dr. C. F. MACDONALD, of the Auburn New York State Asylum for Insane Criminals says (Report for 1882) that he has been struck with the frequency of cases in which expressed delusions were absent, although the manner and conduct of the individual clearly indicated a delusional state. Comparing these individuals with their former selves, there are found clear evidences of a departure from their normal mental state. They become sullen, morose, and morbidly irritable. They rebel against the ordinary rules of discipline, and make unprovoked assaults upon those around them, without apparent motive and without offering any explanation therefor. The suffering from impairment of bodily functions is shown by sleeplessness, loss of appetite, coated tongue, foul breath, constipation, a "greasy" condition of the skin, and a livid, puffy appearance of the extremities, indicating a relaxed state of the blood-vessels. They are generally coherent in conversation, do not complain of being ill, nor apply for medical treatment. They frequently continue in the performance of their allotted tasks in prison for months, before the attention of those in daily contact with them is attracted to their mental disturbance. From this condition they either recover or gradually drift downward to complete dementia, with no outward exhibition of mental excitement to mark the course of diseases. Acute delirious mania, is excep-

tional among the criminal insane ; melancholia and dementia, with an occasional case of subacute mania, being the predominant types of insanity observed here. A certain proportion of cases, usually those of hardened criminals, are characterized, in their mental manifestations, by the most pronounced vicious tendencies, their insanity apparently expressing itself in a marked exaggeration of the depravity and vice displayed by them, prior to the onset of their disease. On the mental side, this is substantially the only evidence of disease which these cases present. Physically, however, their condition is more or less marked by the signs of bodily impairment above referred to. Known to the authorities as abandoned and depraved individuals, it is not surprising that their insanity is not recognized by casual observers when it occurs. He says that a hospital for insane criminals can be conducted on the same general principles, and with as good results, except in the matter of cures, as are hospitals for the ordinary insane. Visitors passing through the wards of this hospital, are struck by the marked absence of noise or disturbance of any kind, this being the usual condition night and day. They not unfrequently ask to be shown "the violent cases," and "those you have to keep tied up in their cells," or in "strait-jackets"; and when informed that no mechanical restraint of any kind is used here ; that there are no cells ; that there *is* no "disturbed" ward ; and that the patients they have seen are the worst cases, they are apt to look incredulous and doubting, apparently being unable to realize that criminal lunatics are controlled by kindly influences, and that order and quietude prevail among what they had supposed to be the most violent class of insane. The principal difficulties encountered in the management of this institution are, the prevention of escapes, and a propensity of certain homicidal patients to obtain and conceal articles for the purpose of using them as weapons of assault. To prevent these occurrences involves the exercise of constant care and vigilance. Cases of simulated insanity are obviously of much more frequent occurrence here than in general asylums. They are troublesome while they remain, but detection is not difficult, and is immediately followed by a return to prison. If it were generally understood in the prisons, that a convict detected in an attempt to feign insanity would forfeit the commutation of sentence allowed him for good conduct, this would render such attempts of rare occurrence. Insane criminals, in their efforts to escape, frequently display a wonderful combination of shrewdness, cunning, and ingenuity. Patients of both classes, who have committed crimes against the person, are more dangerous, but less inclined to escape than are those who have committed crimes against property. Restraint has been disused since the summer of 1882.

ATTEMPTED MURDER OF A PHYSICIAN BY AN HALLUCINATED LUNATIC.—DR. LE GRAND DU SAULLE (*Gazette des hôpitaux*,

October 11, 1883) reports the case of an hallucinated lunatic, with delusions of persecution, who attempted to kill the health inspector of the French shipping. The would-be homicide was a natural son, and his ancestral history was not obtainable. Details of his life were meagre. He had changed from one trade to another. He was of a saturnine disposition naturally ; to rid himself of his depression he drank freely. In 1878 he believed himself poisoned, and in consequence entered a hospital. At this time he accused a hotel-keeper of persecuting him ; later he believed himself the victim of a conspiracy on the part of this hotel-keeper, and followed the latter in the street with criminal intentions. He then had rumblings in his ears, and invisible persons worked on him with little machines, compelling him to alter his lodging to avoid them. Later on he heard voices saying aloud what he thought and did. As he had a mirror in his room, he believed these to be reverberated sounds, and returned the mirror, but the sounds did not cease. Once some one tried to shoot him with a revolver, and others spied upon him, torturing him physically and morally. He was worked on by the telephone, the microphone, by electricity, and in all sorts of ways. Once a voice told him to throw himself out of the window, but he refused to do this until he had unmasked his tormentors. In 1879 he was sent to a hospital for the insane, and improved so much that, strange to say, it was deemed safe to discharge him. On being discharged, his old habits were resumed, and his old troubles re-appeared. A voice told him to buy a knife, and he did so. Feeling the need of protection, he placed himself under the ægis of a deputy, with whom he was slightly acquainted, who wrote to a police prefect that C. (the patient) was a decided lunatic. In December, 1880, Dr. du Saulle examined him, and certified that C. then had the scheme of killing a policeman. In consequence C. was again sent to a hospital, whence he escaped in April, 1882. For a long time he remained quite temperate and working hard ; September, 1883, he again became intemperate, and his delusions and hallucinations resumed their sway, and fearing poison, he believed himself doomed to starvation. September 25, 1883, not having eaten any thing for four days, he was feeble and broken-down. He felt that his head had been electrified, and walked up and down without knowing where he was going. He heard a voice saying : " Kill yourself," but he said : " Why should I kill myself ? The guilty kill themselves. Why give my persecutors the satisfaction of my suicide ? " Then the voice said : " If you don't wish to kill yourself, kill him." At this time the rain was pouring down, and he saw a man under an umbrella, at whom he fired twice. From a newspaper he soon after learned that he had shot a physician, to whom he wrote an anonymous letter, stating his persecutions. He went to an infirmary, near a police-station, and asked for meals and a bed of one of the assistants, who refused him without an order. He then went to a

magistrate and accused himself of his crime. When examined, he had olfactory hallucinations. In Dr. du Saulle's opinion alcoholic intemperance only intensified an existing vesania. This case alone shows both the peculiar reasoning of the insane, and that a crime seemingly dissociated with a delusion may indirectly result from it. The discharge of this patient from a hospital for the insane is somewhat inexplicable.

CEREBRAL VISION AFFECTIONS IN PARETIC DEMENTIA.—STENGER (*Archiv für Psych.*, B. xiii.) has studied eight cases of visual defects in paretic demented, and has been able to supplement these by five autopsies. In one of the cases intracranial disease had attacked the speech- and sight-centres. The patient at every attack lost, for about ten days, physical perception of all visual objects. Memory of most objects returned, but a few were permanently forgotten. After many attacks no optico-psychical images were remembered; all perception of visual objects was lost. In a second case, after decided right hemiplegia, cerebral amaurosis and aphasia occurred. After four weeks these disappeared, but reappeared after a second attack, and were accompanied by destruction of the sense of feeling. A few days after this vision was completely lost in the right eye (Munk's cortical amaurosis). A third attack was followed by loss of consciousness and death. On autopsy there were found extensive left frontal lobe atrophy, pial cloudiness and thickening—most marked in posterior convolutions,—and general firm pial adhesions to the cortex. Right hemianopsia occurred whenever the cortex or medullary fibres leading to it from the occipital lobe were destroyed. The defect in the visual field was greatest in the right eye. Left hemianopsia occurred with disease of the right occipital lobe. According to the amount of destruction, the hemianopsia was partial or total.

VISCERAL SYPHILIS IN THE INSANE.—Dr. W. J. MICKLE (*Journal of Mental Science*, January, 1884) cites two cases in which very decided visceral syphiloses were found. One case, with marked mental deterioration, had been insidious in origin but preceded by frequent manifestations of constitutional syphilis. The patient muttered to himself, was morose, unsociable, wandering about with depressed mien and bowed head; but was easily roused to violence. He collected rubbish under (it was said) a delusion that it was jewels. Later on he was restless and incoherent, but worked well and laughed without cause. He died really from the exhaustion produced by tertiary syphilis. Pulmonary, hepatic, renal, splenic, and osseous tertiary syphiloses were found on autopsy. The brain and membranes did not differ from those of non-syphilitic terminal demented. The second case was maniacal, incoherent, and had exalted delusions; he subsequently became silent under the delusions: that his speech had been stopped by the power of a former medical attendant. that his speech was visible, and that his words flew into others in his vici-

nity and affected them injuriously. Transient delusions of ill treatment and neglect were manifested during the last days of his life. On autopsy, hepatic, vascular, and pulmonary syphiloses were found. The meningo-encephalic changes were those of terminal dementia. Dr. Mickle says that, in this class of cases, the constitutional syphilis acts either as producing an acquired predisposition to insanity, or produces a psychosis by way of toxæmia or by way of the combined influence of syphilitic cachexia and anæmia. That syphilis can produce insanity without causing other than bio-chemical cerebral changes is shown by the cases reported as resulting from secondary syphilis (JOURNAL OF NERVOUS AND MENTAL DISEASE, July, 1880); and that other encephalic changes, clearly dependent on syphilis, cannot be demarcated from those of non-syphilitic origin, has been shown by Luys and others. Dr. Mickle's researches tend in the same direction. He raises the interesting question: whether insanity does not make the brain a more easy prey to specific lues.

DEFINITIONS OF INSANITY.—This ever-recurring question is the topic of discussions only in Anglo-Saxon countries, and to the literature of the subject two new contributions have been made. Dr. W. K. HUGGARD (*Journal of Mental Science*, January, 1884), defines insanity as "any mental defect that renders the person unable to conform to the requirements of society." There is a great deal to be said in favor of this definition, and it is certainly not too narrow nor yet too broad, though other than in brevity wherein is it an improvement on the definition proposed by Kiernan (JOURNAL OF NERVOUS AND MENTAL DISEASE, October, 1881)—that "insanity is a morbid mental condition, produced by cerebral disease or malformation, which perverts the relations of an individual to his surroundings, or to what from his birth, education, and circumstances might be expected to be such surroundings." Dr. J. LEONARD CORNING (*Medical Record*, Dec. 1, 1883), says: "*Insanity is the psychic manifestation of impaired brain-function*, consequent upon causes resident in the brain, or upon extraneous causes acting upon it (the brain). This definition to include not only all 'forms' of mental disease already recognized, but also those forms of mental impairment which, owing to flagrant inconsistency, are not generally recognized as insanity. Besides the known forms of insanity, this definition also includes all forms that ever can be recognized, provided it be conceded that the brain is the seat of mind. It is evident that this definition includes the case of the man who has received a blow upon the head, causing confusion of ideas or unconsciousness. Moreover, it also includes the case of a man insensible from the effects of cerebral hemorrhage. But such persons are certainly sufferers from mental ill-health; they are not mentally sane, therefore they must be insane. An intermediate stage is philosophically unthinkable. Moreover, a term designed to connote morbid mental manifestations should include more than one or several kinds of

such manifestations. What, for example, would be thought of the clinician who should declare that a person with gastritis was unsound, whereas another suffering from pneumonia should be pronounced sound (or perchance neither well nor unwell!). The pathology of corporeal disease is co-extensive with the limits of the entire body; the pathology of the mind is as broad as the mind itself. Consequently all generic appellation designed to express bodily unsoundness should include within its scope *all* manifestations of bodily ill-health; consequently, also, any generic name designed to express mental unsoundness should include *all* manifestations of mental ill-health. *Scientifically*, therefore, there is no 'border line' between health and sickness; between mental sanity and mental insanity. An individual must be healthy or unhealthy; sane or insane. There is no 'border land,' except such a one as can be produced by an argument which, followed to its legitimate sequences, can only end in the most complete *reductio ad absurdum*. A subject cannot sit astride of the 'border line,' with one leg dangling in sanity and the other in insanity."

Now, while all this is almost truistic, it would puzzle even Dr. Corning to define what he means by psychic manifestation and impaired brain-function, so as to clearly demarcate, and even accepting his ideas as expressed at his own value of them, where shall be put the sufferers from teratological defect, who cannot be said to be sufferers from "mental ill-health," and if these be excluded, the primary monomaniacs must no longer be considered insane. On the other hand, there is a debatable ground arising from this very teratology, which while it does not contradict Dr. Corning, shows that his reasoning, while applicable, pathologically speaking, is scarcely valid from the teratological stand-point. A few quibbles might also be made about the question of an unconscious man giving psychic manifestation of impaired brain-function, since manifestation has rather a positive than a negative meaning; but as the definition, like other definitions in science, is only based on assumptions, such carping is out of place. Definitions in science, other than relative, are impossible, and, strictly speaking, it is true, as has been said by Dr. Savage (*Journal of Mental Science*, Jan., 1884): "We can no more define insanity than we can, by definition, give an impression of a rainbow or landscape."

PAUPER LUNATICS AND DENSITY OF POPULATION.—The Twenty-fifth Annual Report of the General Board of Commissioners in Lunacy for Scotland concludes with respect to this subject that: A larger number of persons annually become pauper lunatics in urban than in rural localities. Pauper lunatics in urban localities remain pauper lunatics for shorter periods than in rural localities. The excess in admissions to urban asylums is due to the fact that the patients who make up such excess are of mainly such as would not be sent to asylums in rural districts. They are divisi-

ble into two classes: 1st, those laboring under curable insanity of short duration; 2d, persons placed in asylums perhaps on account of the exigencies of urban life, making removal from home necessary so long as their disease manifests itself in an acute form. There is reason to believe that the statistics of pauper lunacy are the results of causes similar to those which affect the statistics of pauperism. The statistics of pauper lunacy cannot be taken as an indication of the amount of insanity in the country.

RECIPROCAL INSANITY.—Under this title, Dr. R. L. PARSONS (*Alienist and Neurologist*, October, 1883) discusses *folie à deux*, and concludes: *First*: That, although under ordinary circumstances the contagion of insanity does not extend from one person to another, the influence of the insane on persons inheriting similar faults of constitution, or a known predisposition to a similar form of insanity, should be avoided as dangerous. *Second*: That the conditions favoring contagion are more likely to occur among blood-relations who are intimately associated. *Third*: That emotional forms of insanity are especially liable to extend from one child to another; and also in a lesser degree among women. *Fourth*: That when two or more persons thus become insane, through similarity of predisposition, sympathy, and intimacy of association, they usually exert an adverse reciprocal influence upon each other, both as cause and effect of their insanity. *Fifth*: That the contagion of insanity under the influence of sympathy, predisposition, and intimate association, is most likely to occur during the inception and developing period of the disease; and that this liability ought to be taken into consideration, among other reasons, in determining the question whether it is advisable to treat insane patients at their own homes during the early stages of their insanity. The last conclusion, in its final phrase, gives a therapeutic hint of most decided value.

MELANCHOLIA IN A BOY OF ELEVEN.—KOWALEWSKY (*Medic. Westnik.*, No. 11, 1883) has had under operation an eleven-year-old boy, who had no hereditary taint, but who, after several severe attacks of the exanthemata, became depressed, lost all interest in his surroundings, sought solitude, cried all day, at night had hallucinations of sight, and during the day delusive conceptions that he was unlucky and incapable and ought to die. After five months' treatment in the hospital, with tonics and warm baths and fresh air, he recovered, the affection having lasted a little over a year.

J. G. KIERNAN, M.D.

d.—THERAPEUTICS OF THE NERVOUS SYSTEM.

THE DOSIMETRIC EMPLOYMENT OF CHLOROFORM IN PRODUCING ANÆSTHESIA.—M. Paul Bert presented to the Société de Biologie (*Comptes Rendus*) the method employed by Dr. Pezraud, which consists in placing a very fine small compress over the nose and mouth of the patient, and dropping upon it with each respiration one drop of chloroform; at the end of a few minutes, if insensibility does not follow, two drops are given, and by this method complete insensibility is produced at the end of seven to ten minutes. During this time the pulse and respiration remain regular, and anæsthesia obtains in a progressive manner, with only the slowing of the pulse to indicate it; there is no agitation and no hyperæsthesia, even with alcoholics or nervous women. When anæsthesia has been produced, it is maintained by three or four drops of the chloroform every minute. By calculation, it takes in this way a mixture of ten to fourteen grammes of chloroform with 100 litres of air to produce the anæsthesia.

THE MEDULLA AND SEXUAL DISORDERS.—In spinal and sexual neurasthenia, Dr. Alexander Harkin says that the centres ought to be treated, not the periphery. The chief centre, as regards the sexual function, lies, he thinks, in the medulla. He applies wet cups, therefore, to the nape of the neck, and reports remarkable cures.

Dr. Harkin has also reported remarkable success with blisters over the heart in acute rheumatism, but his experience was not corroborated by that of others.—*The Practitioner*, Feb., 1884.

HYDROBROMIC ACID IN EPILEPSY.—Dr. H. C. Wood gives the results of the employment of hydrobromic acid in twelve old-standing cases of epilepsy. He gives the following comparative table :

Medicine, Daily Dose.	Number of Days.	Number of Fits.	Average number of fits occurring in the 12 patients conjointly, per day.
Bromide of sodium, 75 grains . . .	33	227 (or 95)	6.9 (or 2.9)
No medicine	15	241	16.1
Acidum hydrobromicum dilutum, f $\frac{3}{4}$ iss	23	81	3.5
Ibid., f $\frac{3}{4}$ ij f 3 ij	6	12	2.0
Ibid., f $\frac{3}{4}$ iij	43	79	1.8
Bromide of potassium, 90 grains . . .	62	132	2.2

It will be seen that the effect of the acid in reducing the number of fits was directly proportionate to the dose, and was very pronounced. When three fluid ounces were given daily, the number of fits was reduced to about one tenth of those which occurred when no remedy was administered : whether the greater number

of fits which happened during the three days of epileptic status is deducted or not from the roll of the sodium bromide, the effect of the acid was much greater than that of the seventy-five grains of the salt.—*Medical News*, Feb. 23, 1884.

The reporter has used hydrobromic acid in epilepsy for three years, and finds it occasionally the most efficient form. It is not easy to get private patients to take more than an ounce daily.

Like the other bromides, it sometimes fails entirely to affect the course of the disease.

CONGESTIVE HEADACHE.—Nickel.—After a number of experiments, Dr. J. M. DaCosta decides that the bromide of nickel is much more effective in the congestive form of headache than any other preparation of bromine. Its dose is from five to seven grains.—*Analectic*, Feb., 1884.

CIMICIFUGA IN EPILEPTIFORM NIGHTMARE.—Dr. Ed. M. Small, of Eastport, Maine, sends the report of a case of epileptiform nightmare. It was cured by half-teaspoonful doses of powdered *cimicifuga racemosa* administered at bedtime. The paroxysms at once ceased, and there had been no return in a lengthy period of observation. The patient also was ordered to partake of only a light supper each night.—*Phila. Times*.

CHOREA—HYOSCYAMINE.—A case of chorea, which resisted all other remedies, was shown recently at the medical clinic of Prof. DaCosta, cured by hyoscyamine. The drug was given *ter die*, in doses sufficient to produce very slight characteristic effects, beginning with gr. $\frac{1}{30}$.—*Canada Lancet—Analectic*, Feb., 1884.

NERVE-STRETCHING FOR THE RELIEF OF PAIN.—Mr. John Marshall, who delivered the Bradshawe lecture Dec. 6th, took for his subject that of nerve-stretching. His lecture was an able summary of existing knowledge upon the subject. He showed the therapeutic value of the process by tables of 252 cases. On the subject of subcutaneous nerve-stretching he states that the use of Sayres' apparatus for suspending the body, and the consequent elongation of the body from an inch to two inches and a quarter, led Motschutkowski to experiment. He found the spine elongated to seven-eighths of an inch, but although the membranes moved, he was not sure of more than a slight degree of tension on the posterior nerves. He applied this method to fifteen cases of locomotor ataxy, for ten minutes at a time three times a week, and succeeded in thirteen cases in relieving the pains and abnormal sensations

DUJARDIN-BEAUMETZ ON THE TREATMENT OF CHRONIC

ALCOHOLISM BY STRYCHNIA.—The *Bull. génér. de thérap.* for January 15th gives the views of the author on this subject. He thinks with Luton of Rheims that the sulphate of strychnia can be given with great benefit in all cases of delirium tremens, and other nervous symptoms produced by alcoholism. He recommends the hypodermic injection of five milligrammes of sulphate of strychnia, repeated if necessary after five hours. Luton has emitted the opinion that strychnia could prevent the bad effects of chronic alcoholism, and that a small quantity of it might advantageously be added to alcoholic drinks. Dujardin-Beaumetz, however, refutes that opinion, and says that strychnia does not prevent the visceral lesions of chronic alcoholism.—*Lond. Med. Record*

APOMORPHINE IN THE TREATMENT OF HYSTERO-EPILEPSY.—In a recent number of the *Medical Times and Gazette*, T. Hammond Williams, L. R. C. P., gives notes of two cases of hystero-epilepsy in which he made use of apomorphine. Mental perturbation, he states, was marked in both cases. In one of them, he thinks, it was evidently the result of the uterine function being in abeyance. In the same case the vaso-motor system also seemed to be at fault, for, on pricking the skin, no blood appeared from the cutaneous arterioles and capillaries. Ovarian compression and the use of hydrate of chloral having proved of no avail, hypodermic injections of apomorphine were employed, one fifteenth of a grain at each injection. The first two injections failed to provoke vomiting, their action being retarded, the author thinks, by the fact that the patient was still under the influence of chloral. Finally emesis took place, followed by prostration, drowsiness, and sleep. "The drug," says the author, "no doubt produced the emesis by being carried into the circulation to the great nervous centre in the medulla oblongata, where, by its action, it excited vomiting, besides causing nausea and depression of the circulatory system, and diminishing the muscular and nervous power. It therefore acts as a direct emetic upon the so-called vomiting centre."—*N. Y. Medical Journal*, Dec. 29, 1883.

THE CURABILITY OF LOCOMOTOR ATAXIA.—The opinion has recently been expressed by Dr. Debove that the sclerotic lesions existing in the spinal cord at the time when the lancinating pains are experienced—that is to say, at the beginning of locomotor ataxia, preclude any hopes of curing this affection. In opposition to these views Dr. Desnos affirms that there are cases in which the lesions existing in the posterior columns of the cord are curable. He relates a case of syphilitic tabes in which the pains were very severe and the inco-ordination marked, which was cured, at least all the symptoms were made to disappear, in five weeks by iodide and bromide of potassium with the proto-iodide of

mercury. Dr. Cadiat has reported a case of undoubted locomotor ataxia in which the autopsy showed a simple congestion of the cord without sclerosis, and Dr. Desnos regards his case as one of that kind.—*Annales de dermatologie et de syphiligraphie*, November 25, 1883—*Medical Record*.

THE TREATMENT OF EPILEPSY IN CHILDREN.—Dr. William Pepper, of Philadelphia, has recently delivered a series of clinical lectures upon the treatment of epilepsy in children, which have been published in the Phila. *Medical and Surgical Reporter*. The main points which he insisted upon were: the necessity of attention to diet and general hygiene, regular habits, the removal of every possible exciting cause, and the employment of rest and sleep. Sometimes the children should be put to bed during part of the day.

BROMOFORM, A NEW ANÆSTHETIC AND ANODYNE.—At a meeting of the Society of Physicians of Vienna Dr. Caj. Freiherr v. Horroch reported the results of some experiments with bromoform.

This bromoform was discovered by Löwig in 1832. It is prepared from the hydrate of bromal, by the addition of an alkali. It is an oily, colorless liquid with a pungent ethereal aromatic odor and a sweetish taste. It boils at 151° C., is soluble in warm water and ether.

The physiological action of bromal was first tested by Dr. S. Steinauer (*Virchow's Archiv*, May 19, 1870), who found that it relieved pain and produced sleep. He attributed the action in part to the formation of bromoform. The action of bromoform itself was tested by Dr. Horroch (*Allgemeiner medicin. Zeit.*, No. 3, 1884) in three series of experiments: first, by inhalation; second, by hypodermic injection; third, by giving it by the mouth.

In the inhalation experiments it was found that narcosis was easily produced in animals; the anæsthesia being complete, and the excitation stage short and of a mild form. After recovering from the anæsthesia the animals did not vomit and appeared well.

Hypodermic injections of one gramme of bromoform produced in large animals complete narcosis, lasting for an hour. During this time the temperature fell from 2° to 4° C.

The internal administration of bromoform in doses of one to one and one-half grammes produced sleep of several hours' duration.

The animals experimented upon were rabbits and cats, and the physiological effects upon these animals may be summed up as follows: The respiration is not notably affected. The pulse continues strong, regular, and of ordinary frequency. The peripheral ends of the vagus retain their irritability. The blood-pressure is diminished. Reflex excitability is entirely abolished and irritation of the sciatic nerve failed to effect any changes in

blood-pressure. In very profound narcosis the cortical brain-centres lost their irritability. The temperature of the animals sank in dogs 3.5° C., in rabbits about 4.5° C.

As to the value of bromoform as an anæsthetic in surgery, four experiments had been made upon adults in Professor Albert's clinic. Three men had been successfully anæsthetized. In these cases the excitation period had been short, the patients did not cry or struggle. The stomach was not disturbed. Children had been easily anæsthetized.

On the other hand, bromoform, as an anæsthetic, appeared to be milder than chloroform, and its vapors were somewhat irritating to the respiratory passages.—*Medical Record*, Feb. 16, 1884.

THE TREATMENT OF WRITER'S CRAMP BY MASSAGE AND GYMNASTICS.—Mr. J. Wolff, gives an account of his method of treating cramp and allied affections, by massage and gymnastics. This method is now quite well known and has been endorsed by a number of prominent physicians.—*Medical Record*, Feb. 23, 1884.

JAMAICA DOGWOOD IN THE TREATMENT OF HYSTERIA.—Dr. F. C. Herr, of Philadelphia, Pa., says that he has treated six cases of pronounced hysteria with fluid extract of Jamaica dogwood, "with entire satisfaction." He gives drachm doses of the fluid extract thrice daily, and keeps it up for a long time.—*Therapeutic Gazette*, Nov., 1883.

A SIMPLE OPERATION FOR FACIAL NEURALGIA.—As described by Dr. J. F. Heustis, of Alabama, this consists in cutting down upon the infra-orbital foramen and drilling out the nerve as far back as the spheno-maxillary fissure with a fine steel drill such as dentists use. His patient was cured.—*Medical News*, Dec. 8, 1883.

MENTHOL AS AN ANODYNE.—At the January meeting of the New York Neurological Society, Dr. E. C. Wendt made some remarks upon the menthol cone as an anodyne. He had found it useful in headaches, the milder forms of neuralgia, and rheumatic pains.

Dr. D. Camman adds (*Medical Record*, Feb 23, 1884) that he has found it useful in toothache.

METHOD OF HASTENING THE ANÆSTHETIC ACTION OF THE ETHER SPRAY.—The ether spray is employed frequently at the Hôpital St. Louis in Paris for the production of local anæsthesia. A little device, first indicated by Dr. Letamendi, of Barcelona, but not hitherto utilized in practice, is employed by Dr. Vidal to shorten the duration of the process of congelation. It consists in making a slight prick with a needle at the point upon which the

spray is directed, at the moment when the skin assumes a purplish hue, and when the ether, commencing to solidify, assumes an oily consistency. The little puncture made at this time excites a reflex constrictive action of the vaso-motor nerves, the blood is driven from the part, and the skin becomes white. Another method of hastening the process consists in placing little wads of lint about the part, thus increasing the surface of evaporation.—*Practitioner*, Dec., 1883—*Medical News*.

OLEATE OF ACONITIA AS A LOCAL ANODYNE.—Dr. Howard A. Kelly reports a case of thoracic aneurism where the pain was promptly relieved by rubbing a few drops of the two-per-cent. solution of oleate of aconitia over the affected part. He also refers to cases of trigeminal neuralgia in the practice of Dr. Geo. E. de Schweinitz where the same remedy was successful.—*Medical News*, Dec. 29, 1883.

NITRITE OF SODIUM.—Dr. Sydney Ringer writes to the *Lancet* to say that the dose of nitrite of sodium should be small, two or three grains, and not *twenty*, as stated in his "Handbook of Therapeutics." It has been ascertained that, in the cases in which twenty-grain doses were prescribed by Dr. W. T. Law, a year and a half ago, the specimen of the salt employed was very impure, containing a large percentage of the *nitrate*.

The reporter has observed unpleasant symptoms from five-grain doses given to a girl aged seventeen.

THE SYMPTOMATIC TREATMENT OF PARALYSIS AGITANS.—Erlenmeyer (*Centralblatt für Nervenheilkunde*, 1883, No. 9; *Gazette hebdomadaire de médecine et de chirurgie*, Dec. 28, 1883), after remarking that hydrate of chloral, morphine, bromide of potassium, nitrate of silver, and curare are of no avail in this affection, states that, on the contrary, the constant galvanic current, applied to the head, in the neighborhood of the nucha (feeble currents, continued for from five to twenty minutes), together with the use of a combination of atropine and ergot, is followed by decided amelioration. About half a grain of sulphate of atropine is made into a mass with fifteen grains of extract of ergot, and the mass is divided into thirty pills, of which one is to be taken daily. Pure crystallized hyoscyamine the author regards as both too costly and too dangerous.

VERATRINE IN TREMBLING.—M. Bazile Féris has used veratrine in some cases of trembling, and has obtained excellent results. He has used it in thirteen cases; six being of alcoholic origin, two came on after typhoid fever, and one was due to sclerosis *en plaques*. All patients were rapidly relieved of the disagreeable symptoms.

Féris ordinarily gives veratrine in pills containing gr. $\frac{1}{30}$ each,

the dose being four pills, to be taken during the day. From his results he draws the following conclusions: Trembling dependent upon alcoholism, or upon affections of the nervous system, or consecutive to pyrexia, disappears under the veratrine treatment. The action of the drug is almost instantaneous, but the administration should be kept up for some time after the trembling has disappeared.—*Fourn. de méd. de Paris*, Dec. 8, 1883—*Medical News*.

The reporter has employed veratrine in paralysis agitans with no good result.

TREATMENT OF LOCOMOTOR ATAXIA BY CUTANEOUS FARADIZATION.—Dr. C. Engelskjön reports at length in the *Norsk Magazin for Lægevidenskab*, No. 3, 1883, the histories of two cases of tabes dorsalis treated by him by cutaneous faradization. The first case was that of a lady, thirty-nine years of age, of nervous temperament, and presenting a family history of various nervous diseases. Her ataxia dated back about three years, the first manifestations being a difficulty in ascending the stairs, and a sensation as if she would fall over backward. About six months later she was unable to stand without tottering when the eyes were closed, and began to complain of pains in the limbs. The most varied plans of treatment were tried without effect, and her condition continually grew worse. It was then that a trial was made of a strong faradic current applied to the skin of the forearm. The effect was almost instantaneous. The pains, which had been excruciating, were relieved at once, and although they soon returned, were always driven away by a reapplication of the current. This treatment was continued twice a day for several months, at the end of which time every trace of ataxic walk had disappeared. There was some question in this case whether the symptoms were not hysterical, but the author thought that they were not. The second patient was a man, forty-seven years of age, who gave history of syphilis twenty years previously, and who had had symptoms of tabes for seventeen years. Electricity, applied in the same manner as in the former case, was successful in quieting the pains, though at the time the report was made the treatment was of too short duration to allow of any marked improvement being noticed in the other symptoms; and the author had but little hope that any permanent result would be obtained owing to the length of time that the disease had existed. While he was pursuing these investigations Dr. Rumpf published a paper in the *Neurologisches Centralblatt* describing the same method. Dr. Engelskjön found that the same effect was produced by the galvanic current applied in the same way, and further, that it was due solely to peripheral nerve irritation, as the same or even more striking results, as regards the quieting of the lancinating pains, followed the application of a mustard plaster. He stated that cutaneous faradization has no therapeutic value in those cases of locomotor ataxia the first symptoms of which are referable to atrophy of the optic nerve.—*Medical Record*, Jan. 19, 1884.

THE TREATMENT OF BRAIN EXHAUSTION.—Dr. J. Leonard Corning, in an article upon brain exhaustion, lays down the following principles of treatment :

1. Cerebral rest. 2. Increased general and cerebral nutrition.
3. Elimination of psychical irritation.

The subject is secluded in a darkened room from ten to fifteen hours at a time, according to the amount of sleep it is desired shall be had during the twenty-four hours. The amount of sleep is *progressively* increased by habit, moderate medication, and hydrotherapy, and no attempt is made to produce a sudden state of stupor by the reckless use of sedatives. When the patient awakes, as is usually the case, two or even three times during the hours set apart for rest, nourishment is administered, but always in a fluid and easily digested form. Where difficulty is experienced in again falling asleep, resort is had in the beginning to limited medication. The few hours of wakefulness are devoted exclusively to some form of amusement—reading, writing, and even the mildest forms of mental concentration being absolutely prohibited.—*N. Y. Medical Journal*, Dec. 29, 1883.

PARALDEHYDE AS A HYPNOTIC.—Dr. J. C. Wilson gives additional testimony in favor of paraldehyde as a useful hypnotic. He found that a drachm was a good average dose for an adult.—*N. Y. Medical Journal*, Dec. 15, 1883.

Dujardin-Beaumetz gives an account of his experience with paraldehyde, which agrees in the main with that of previous observers. Dr. Yvon contributes an article upon the pharmacology of paraldehyde.—*Bulletin général de thérapeutique*, Jan. 30, 1884.

The reporter finds that a serious practical difficulty as regards the use of paraldehyde is its unpleasant taste.

HOW TO TREAT EPILEPSY.—A brochure upon the above subject has been published by Dr. A. Kühner. Leipzig u. Neuward, 1884, Heuser's Verlag, viii., 5, 31.

THE OSMIC ACID TREATMENT OF NEURALGIA.—Prof. A. Eulenberg, of Berlin, reports twelve cases of neuralgia treated by hypodermic injections of osmic acid. Of these three were cured, four were more or less improved. Eulenberg thinks that the drug has but feeble anti-neuralgic powers.—*Berlin-klinischn. Woch.*, Feb. 18, 1884.
C. L. DANA, M.D.

BOOKS AND PAMPHLETS RECEIVED.

Illustrations of the Influence of the Mind upon the Body in Health and Disease. To Elucidate the Action of the Imagination. By Daniel Hack Tuke, M.D. Second American from the

second English edition. Philadelphia: Henry C. Lea's Son & Co., 1884.

A Manual of Psychological Medicine and Allied Nervous Diseases. By Edward C. Mann, M.D. Philadelphia: P. Blakiston, Son, & Co., 1883.

Opera Minora. A Collection of Essays, Articles, Lectures, and Addresses. By Edward C. Seguin, M.D. New York: G. P. Putnam's Sons, 1884.

Fat and Blood. An Essay on the Treatment of Certain Forms of Neurasthenia and Hysteria. By S. Weir Mitchell, M.D. Third Edition. Philadelphia: J. B. Lippincott & Co., 1884.

Thermal Springs of the Yellowstone National Park. By A. C. Peale. Author's Edition. U. S. Geological and Geographical Survey. Washington, 1883.

Traité Clinique de la Folie, a Double Forme (Folie Circulaire, Délire a Formes Alternes). Par le Dr. Ant. Ritti. (*Prix Falret*, 1880.) Paris: Octave Doin, Éditeur, 1883.

De l'Ataxie Héréditaire (Maladie de Freidreich). Par le Dr. Auguste Brousse. Paris: Octave Doin, 1883.

Lehrbuch der Gehirnkrankheiten für Aerzte und Studierende. Von Dr. C. Wernicke. Band III. Verlag von Theodor Fischer's medicinischer Buchhandlung, 1883.

L'Homme et l'Intelligence, Fragments de Physiologie et de Psychologie. Par Charles Richet. Paris: Germer Baillière et Cie, 1884.

Spinal Irritation: Probable Cerebral Origin of the Symptoms Sometimes Classed under this Head. By G. L. Walton, M.D. Reprint from *Boston Med. and Surg. Journal*, Dec. 27, 1883.

Manuale Clinico, Terapeutico sulla Impotenza Sessuale nell' Uomo. Del Dott. W. A. Hammond. Ridiziuone dall' Inglese del Dottor A. Rubino. Napoli, 1884.

Concussion of the Spine in Railway Injuries. By John G. Johnson, M.D. Brooklyn, 1883.

The Disease of Inebriety and its Social Science Relations. By T. D. Crothers, M.D. Reprint from *Journal Social Science*. Boston, 1883.

Sixth Inaugural Address of Clark Bell, President N. Y. Medico-Legal Society. Jan., 1884.

Morbid Somnolence. By Rudolph Matas, M.D.

Borderland Psychiatric Records. Prodromal Symptoms of Psychical Impairment. By C. H. Hughes, M.D., St. Louis. Reprint, *Alienist and Neurologist*, Jan., 1884.

Fifteenth Annual Report of the Trustees of the Willard Asylum for the Insane, for the year 1883. Albany, 1884.

Thirty-third Annual Report of the State Lunatic Asylum at Harrisburg, Pa., for the year ending Sept., 1883.

Reports of the Trustees and Superintendent of the Butler Hospital for the Insane. Providence, Jan., 1884.

And other Books, Pamphlets, Reports, etc., etc., not here Mentioned.

FOREIGN EXCHANGES.

Annales Médico-Psychologiques.

Archives de Neurologie.

Archiv fuer Anatomie und Physiologie.

Archiv fuer die Gesammte Physiologie der Menschen.

Archiv fuer Path. Anatomie, Physiologie, und fuer Klin. Medicin.

Archiv f. Psychiatrie und Nervenkrankheiten.

Brain.

British Medical Journal.

Centralblatt f. d. Nervenheilk., Psychiatrie, etc.

Deutsche Medicinische Wochenschrift.

Deutsche Archiv f. Geschichte der Medicin.

Dublin Journal of Medical Sciences.

Edinburgh Medical Journal.

Gazetta degli Ospitali.

Gazette des Hôpitaux.

Hospitals-Tidende.

Hygeia.

Journal de Médecine et de Chirurgie Pratiques.

Journal of Mental Sciences.

Journal of Physiology.

Le Progrès Médicale.

Lo Sperimentale.

L' Encéphale.

L' Union Médicale du Canada.

Medizinal-Zeitung.

Medical Times and Gazette.

Mind.

Neurologisches Centralblatt.

Nordiskt Medicinskt Arkiv.

Norsk Magazin for Lagensvidenskabens.

Practitioner.

Revue de Médecine.

Revista Clinica di Bologna.

Rivista Sperimentale di Freniatria.

Schmidt's Jahrbücher.

St. Bartholomew's Hospital Reports.

Upsala Lakarefornings Forhandlingar.

DOMESTIC EXCHANGES.

American Journal of Insanity.
American Journal of Medical Sciences.
Annals of Anatomy and Surgery.
Archives of Medicine.
Buffalo Medical Journal.
Chicago Medical Journal and Examiner.
Cincinnati Lancet and Clinic.
College and Clinical Record.
Detroit Lancet.
Journal of Inebriety.
Journal of Physiology.
Maryland Medical Journal.
Medical and Surgical Reporter.
Medical News and Abstract.
Medical Record.
Nashville Journal of Medicine.
New England Medical Monthly.
New Orleans Medical and Surgical Journal.
New York Medical Journal.
New York Medical Abstract.
Pacific Medical and Surgical Journal.
Philadelphia Medical Times.
Proceedings of the Medical Society of the County of Kings.
Quarterly Epitome of Braithwaite's Retrospect.
San Francisco Western Lancet.
St. Louis Courier of Medicine.
St. Louis Medical and Surgical Journal.
Virginia Medical Monthly.
Walsh's Retrospect.

THE
Journal
OF
Nervous and Mental Disease.

Original Articles.

THE RELATION OF THE NERVOUS SYSTEM
TO THE TEMPERATURE OF THE BODY.

By ISAAC OTT, M.D.

THAT the nervous system has an influence upon heat-production has been known since the time of Brodie, who called the attention of the profession to the rise of temperature seen after a lesion of the spinal cord. He believed the central nervous system to have an immediate influence on heat-production. The proofs that the nervous system has a direct action on the heat of the body may be classed, for purposes of study, into thermometric, chemical, and calorimetric. Thermometric facts: Tscheschichin was the first to announce the existence of an inhibitory heat-centre in the nervous system. In rabbits, after he divided the spinal cord, there was a fall of temperature, but after he divided the medulla from the pons there was a rise. He believed the rise of temperature to be due to the removal of a nerve-centre in the higher parts of the brain inhibiting the thermogenic centres. Nauyn and Quincke found in dogs that after section of the spinal cord there was at first a fall of temperature, which was followed by a rise. They attributed this to an actual increase of heat-production, which, in

time, overcame the dissipation engendered by vaso-motor paralysis. Parinaud found, after section of the spinal cord, in rabbits, a continuous fall in temperature, especially of the deeper parts of the body. Schreiber discovered, after injury of the pons in all its parts, the cerebral peduncles, the cerebrum, and cerebellum, an increase of the temperature of the body, when heat-dissipation was prevented by artificial means. The rise of temperature was constant after an injury between the medulla and the pons; he used rabbits. Eulenberg and Landois found an increase of temperature after removal of the cortex cerebri about the sulcus cruciatus. Prof. Hitzit has arrived at similar conclusions. Chemical facts: In dogs, Leyden and Fränkel found the carbonic acid increased in fever. Colasanti and Pflüger found cold to increase the amount of carbonic acid and the absorption of oxygen, which has been confirmed by Sanderson, Röhrig, and Zuntz. It was discovered by the two latter observers, that, in poisoning with urari there was a marked diminution in the consumption of oxygen and the excretion of carbonic acid; the bodily temperature also fell, even when prevented by external preventive measures. In the uninjured animal the external cold excites some sensory nerves which, conveying impressions to the central nervous apparatus, cause it to send out afferent impulses to the muscles, increasing tissue-metamorphoses, and thus furnishing more heat. But when the nerves going to the muscles are paralyzed by urari, then these efferent impulses can not reach the muscles, and no increment of tissue-change takes place upon the application of cold. The experiments of Pflüger and his pupils tend to show that there is a nervous apparatus by which external cold increases the tissue-metamorphoses, and thus generates more heat. Hence chemical data support the thermometric, and the view of Tscheschichin, that there is a nervous ap-

paratus to inhibit thermogenic centres. From this stand-point fever is supposed to cause a paresis of the inhibitory mechanism allowing the thermogenic centres to come into play of exaggerated activity. Colasanti found in the guinea-pig that, in pyrexia, the usual reaction did not ensue upon the application of external cold. Finkler has made a very exhaustive study of the phenomena of fever, and deduced the law that the consumption of oxygen is increased during fever, and that there is an increase of carbonic acid due to increased heat-production. He also arrives at the conclusion that fever is a neurosis, mainly a disease of a nervous system regulating the temperature. Calorimetric facts : Profs. Senator, Leyden, and Wood have studied the matter by means of the calorimeter. Senator found in fever an increased heat-production, which has been confirmed by Prof. Wood's numerous experiments on the subject. Wood is the only one who has calorimetrically studied the effect of sections in a transverse direction of the nervous system from the spinal cord upward at different levels. He confirms Tscheschichin's theory, that the inhibitory heat-centre is probably in the pons varolii. Hence thermometric, chemical, and calorimetric proofs go to show that the phenomena of heat are dominated by the nervous system.

My plan has been to make transverse sections of the brain, not from below but from before backward. The experiments were made on rabbits and cats. The apparatus used was d'Arsonval's calorimeter and Voit's respiration-apparatus. The calorimeter is composed of two concentric conical cylinders forming two cavities : the central one is the inclosure for the animal ; the other annular cavity is filled with distilled water, which uniformly distributes the heat around the inclosure containing the animal, and prevents sudden variations of temperature. The external copper

wall of the calorimeter has a tube on one side which communicates with the water cavity, and is closed externally by a vertical rubber membrane, which is the only portion of the calorimeter that can be pushed outwardly by the variations in the volume of the water, the apparatus being closed. To the side-tube of the calorimeter, is attached the gas-mechanism. The gas is carried by a tube which normally opens at the centre of the rubber membrane. At a small distance from the gas-tube there is an exit-tube, which permits the gas to escape from the brass box to the burners, which heat the calorimeter. The gas-tube and rubber membrane form a sort of stop-cock of a very sensitive nature, and whose amplitude of openness is dependent upon the variations in the volume of water, which only allows the gas-burners to consume a quantity necessary to compensate the dissipation of heat. In this combination the combustible warms directly the water, which, being the regulator, in its turn, reacts directly upon the combustible gas. Between the two concentric cylinders, passing through the water, is a hollow tube conveying air, one end of which opens externally, and the other in the inclosure containing the animal. In my method of experimentation, part of the air supplied the animal was conveyed to it through this tube.

The management of the apparatus was as follows :

The annular space between the two copper cylinders was filled with water by the external orifice. In this orifice a thermometer was placed, it being arranged so as to allow the escape of the heated water, not closing the aperture ; the tubes of rubber going to the burners are adjusted, the gas-tube is screwed against the rubber membrane ; when the thermometer attains the desired temperature, it is removed and the space occupied by enough water to fill the cavity made vacant by the thermometer. Then the orifice is closed either by a rubber stopper containing in it a ther-

mometer-bulb, or a rubber stopper perforated with a hollow, glass tube permitting the water to rise in it. The apparatus is now regulated for this temperature by the following mechanism: one tube, which conveys the gas, carries a small movable disk, which applies itself against the rubber membrane, and tends without cessation to remove it from the orifice of the gas-tube, this action being due to a small spring, upon which the disk rests. The water, enlarging in volume, mounts up the glass tube, and this column of water exerts upon the rubber membrane a pressure more or less strong, which gradually antagonizes the elasticity of the spring, and brings the membrane more and more against the orifice from which the gas escapes. There is a constant play between the variations in the volume of the water and the amount of gas given to the gas-burners: the more the water expands the less gas is consumed, and *vice versa*. To obtain the full sensitiveness of the apparatus, a solid rubber cork is used, instead of one with a glass tube, for the external orifice. This apparatus, upon testing, will remain nearly fixed in temperature for a long time. Geissler's thermometers were used, after having been carefully tested at the Yale Observatory and the necessary corrections made. The temperature of the animal was taken by a rectal thermometer, which was inserted fifty millimetres at each trial.

To close the space occupied by the animal a brass door inclosing a glass and lined at its edge by rubber was used. The closure was made air-tight by screws and bolts.

The calorimeter had its central exit-tube attached to the main air-tube of Voit's respiration-apparatus, through which the air of the calorimeter was aspirated by means of the water-wheel driving the great meter. To describe Voit's apparatus would require too much space. My instrument was made under Prof. Voit's direction, and its management

as well as the estimates of carbonic acid and water were carried out as laid down by him in the *Zeitschrift für Biologie*, Band xi., Heft, 4. The method pursued was as follows: The animal was placed in the calorimeter and the change in the rectal thermometer noted as well as the amount of air aspirated from the calorimeter. After an hour or two the animal was removed, etherized, and a transverse section in the brain was made. When it had recovered from the ether it was again placed in the calorimeter and the same changes as heretofore noted. All experimentalists hitherto have made transverse sections of the central nervous system from the spinal cord upward. The plan I pursued was to commence at the anterior part of the brain and to go backward. The skull was broken up by a bone forceps and the "seeker" introduced, the section being made by its blunt-edge. The small "seeker" penetrated the cortex with but little injury to it, and when it reached the base of the brain was drawn transversely so as to divide the parts without injuring the cortex of either side. At the side of entrance the blunt instrument made an injury of but a few millimetres in extent.

In *Experiment 1* the temperature at the end of the experiment was the same as at the end of the normal observation—that is, 104° . Here the olfactory bulbs were divided. When a transverse section was made behind the corpora striata the temperature was as follows: In exp. 3 the rise was $4\frac{7}{8}^{\circ}$, in exp. 4 the rise was $4\frac{3}{8}^{\circ}$, in exp. 7 the rise was 1° , in exp. 8 the rise was $1\frac{7}{8}^{\circ}$, in exp. 10 the rise was $2\frac{3}{8}^{\circ}$, in exp. 11 the rise was $2\frac{1}{16}^{\circ}$, whilst in exp. 5 the fall of temperature was $\frac{2}{8}^{\circ}$, probably due to shock. When a transverse section was made through the middle of the corpora striata, in exp. 2 there was a rise of 7° , in exp. 6 a rise of $1\frac{5}{8}^{\circ}$, whilst in exp. 12 there was a fall of $6\frac{3}{8}^{\circ}$. If an observation was made on the day following a section behind the corpora striata,

the rise in exp. 11 was $1\frac{14}{100}^{\circ}$, showing that the rise of temperature is not wholly temporary. That this rise is not due to injury to the convolutions of the brain is shown by the following experiments: In exp. 9 the convolutions of one hemisphere were destroyed and the fall of temperature was $3\frac{2}{8}^{\circ}$, whilst where the sulci cruciati were destroyed, as in exp. 14, there was no change in the temperature, but when a section was made through the middle of the corpora striata the rise of temperature was $\frac{4}{8}^{\circ}$, notwithstanding the removal of the sulci cruciati.

In exp. 13 the convolutions of both hemispheres were destroyed anterior to the sulci cruciati, and the temperature fell $\frac{7}{8}^{\circ}$.

All these experiments lead up to the conclusion, that in the vicinity of the corpora striata are centres which have a relation to the temperature of the body.

Whether the rise of temperature here is due to heat-dissipation being lessened or to increased heat-production I am not able to say. By a different arrangement of the calorimeter I propose to determine it. The analyses of carbonic acid were too few to draw conclusions from.

It is known in man that a very extensive lesion of the internal capsule is often followed by a very marked rise in the temperature of the body.¹

Appended are the experiments upon which the preceding statements are based.

C. T. means calorimeter temperature ; R. T. rectal temperature.

In the second observation on the same day the calorimeter temperature is not given, because it is the same as in the normal observation. If it differs, from that of the first or normal observation it is noted.

¹ Ranney: The internal capsule reprint. 1883.

Experiment 1.

TIME.	CALORIMETER T.	RECTAL T.
1:15 P.M.	88.86°	102 $\frac{3}{8}$ °
2:30 "		104 $\frac{3}{8}$ °
		<hr/>
		605.7°
3:44 P. M.		101 $\frac{1}{3}$ °
4:59 "		104 $\frac{3}{8}$ °
		<hr/>
		0

Rabbit: section of olfactory lobes just as they emerge at the anterior edge of the brain. Weight 2 $\frac{7}{10}$ lbs.

Experiment 2.

TIME.	C. T.	R. T.
12:25 P.M.	84.86°	101 $\frac{1}{8}$ °
1:55 "		104 $\frac{1}{8}$ °
		<hr/>
3:15 P.M.		104 $\frac{3}{4}$ °
4:30 "		111 $\frac{1}{2}$ °
		<hr/>
		7°

Cat: weight 5 $\frac{11}{10}$ pounds. Transverse section through the middle of the corpora striata.

Experiment 3.

TIME.	C. T.	R. T.
12:25 P.M.	74.50°	102 $\frac{3}{8}$ °
1:40 "		102 $\frac{3}{8}$ °
		<hr/>
		611.5
2:30 P.M.		106 $\frac{1}{8}$ °
3:45 "		107 $\frac{2}{8}$ °
		<hr/>
		4 $\frac{7}{8}$ °

Rabbit: weight 3 $\frac{29}{10}$ pounds. Transverse section just behind the corpora striata.

Experiment 4.

TIME.	C. T.	R. T.
2:38 P.M.	77.30°	103 $\frac{3}{8}$ °
3:38 "		103 $\frac{4}{8}$ °
		<hr/>

3:55 P.M.	103 $\frac{7}{8}$ ^o
5:10 "	107 $\frac{3}{4}$ ^o
	<hr/>
	4 $\frac{2}{8}$ ^o

Weight of rabbit, $4\frac{2}{5}$ lbs. Transverse section destroying anterior part of optic thalami and posterior half of corpora striata.

Experiment 5.

TIME.	C. T.	R. T.
1:45 P.M.	77.10 ^o	102 $\frac{5}{8}$ ^o
3:00 "		103 $\frac{2}{8}$ ^o
		<hr/>
		$\frac{3}{8}$ ^o
3:35 P.M.		102 $\frac{2}{8}$ ^o
4:50 "		103 ^o
		<hr/>
		$\frac{2}{8}$ ^o

Rabbit: weight $24\frac{5}{8}$ pounds. Section crushing a part of thalami, and a part of corpora striata; animal unable to stand, suffering from shock.

Experiment 6.

TIME.	C. T.	R. T.
11:12 A.M.	74.50 ^o	101 $\frac{2}{8}$ ^o
12:12 P.M.		102 $\frac{2}{8}$ ^o
		<hr/>
1:35 P.M.		102 $\frac{3}{8}$ ^o
3:05 "		104 ^o
		<hr/>
		1 $\frac{5}{8}$ ^o

Rabbit: weight $3\frac{1}{5}$ lbs. Section through the middle of the optic thalami, but not completely down to their base.

Experiment 7.

TIME.	C. T.	R. T.
4:13 P.M.	78.90 ^o	105 $\frac{4}{8}$ ^o
5:13 "		105 $\frac{6}{8}$ ^o
		<hr/>
5:57 P.M.		104 $\frac{1}{8}$ ^o
6:17 "		106 $\frac{6}{8}$ ^o
		<hr/>
		1 ^o

Rabbit: weight $2\frac{2}{5}\frac{5}{0}$ lbs. Section just behind the corpora striata.

Experiment 8.

TIME.	C. T.	R. T.
1:10 P.M.	75.67°	$99\frac{5}{8}^{\circ}$
2:10 "		$101\frac{6}{8}^{\circ}$
		<hr/>
2:51 P.M.		$98\frac{3}{8}^{\circ}$
3:51 "		$103\frac{5}{8}^{\circ}$
		<hr/>
		$1\frac{7}{8}^{\circ}$

Cat: weight $2\frac{3}{5}\frac{3}{0}$ lbs. Transverse section dividing the corpora striata from the optic thalami, grazing sharply the thalami.

Experiment 9.

TIME.	C. T.	R. T.
12:50 A.M.	74.00°	$101\frac{5}{8}^{\circ}$
1:50 "	75.30°	$102\frac{5}{8}^{\circ}$
		<hr/>
		1°
2:43 P.M.		$97\frac{3}{8}^{\circ}$
3:57 "		$99\frac{3}{8}^{\circ}$
		<hr/>
		$3\frac{3}{8}^{\circ}$

Cat: weight $2\frac{5}{5}\frac{0}{0}$ lbs. Convolutions of right side of brain broken up.

Experiment 10.

TIME.	C. T.	R. T.
2:00 P.M.	78.50°	$99\frac{7}{8}^{\circ}$
3:15 "		$100\frac{2}{8}^{\circ}$
		<hr/>
4:59 P.M.		100°
5:54 "		$102\frac{2}{4}^{\circ}$
		<hr/>
		$2\frac{2}{8}^{\circ}$

Kitten: weight $2\frac{2}{5}\frac{5}{0}$ lbs. Section dividing the corpora striata from the optic thalami.

Experiment 11.

TIME.	C. T.	R. T.
1:24 P.M.	86.70°	$101\frac{4}{8}^{\circ}$
1:40 "		$101\frac{9}{16}^{\circ}$

4:00 P.M.	$103\frac{3}{16}^{\circ}$
5:00 "	$103\frac{5}{8}^{\circ}$
	<hr/>
	$2\frac{1}{16}^{\circ}$

Cat: weight $6\frac{3}{5}$ lbs. Section behind the corpora striata. On the next day after the operation the following experiment was made:

2:15 P.M.	93.00°	$103\frac{1}{2}^{\circ}$
3:15 "		$103\frac{1}{2}^{\circ}$
		<hr/>
		$1\frac{1}{8}^{\circ}$

Experiment 12.

TIME.	C. T.	R. T.
3:10 P.M.	92.30°	102°
4:10 "		$104\frac{3}{8}^{\circ}$
6:41 P.M.		98°
7:41 "		98°

Cat: weight $4\frac{2}{5}$ lbs. Section through the middle of the corpora striata.

Experiment 13.

TIME.	C. T.	R. T.
12:18 P.M.	76.5°	$103\frac{1}{8}^{\circ}$
1:18 "		$102\frac{4}{8}^{\circ}$
3:14 P.M.		$101\frac{5}{8}^{\circ}$
4:29 "		$101\frac{5}{8}^{\circ}$
		<hr/>
		$-\frac{7}{8}^{\circ}$

Cat: destruction of convolutions anterior, to sulcus cruciatus. Weight $7\frac{2}{5}$ lbs.

Experiment 14.

TIME.	C. T.	R. T.
10:32 A.M.	54.0°	$103\frac{1}{8}^{\circ}$
11:32 "		$103\frac{1}{8}^{\circ}$

Cat: sulci cruciati destroyed. Next day the following observations were made:

11:5 A.M.

 75.0° $103\frac{1}{8}^{\circ}$

12:5 P.M.

 $103\frac{1}{8}^{\circ}$

A section was now made through the middle of corpora striata.

1:42 P.M.

 75° $101\frac{5}{8}^{\circ}$

2:42 “

 $103\frac{5}{8}^{\circ}$

 $+ \frac{4}{8}^{\circ}$

ON MORBID DROWSINESS AND SOMNOLENCE.

A CONTRIBUTION TO THE PATHOLOGY OF SLEEP.

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I WISH to call attention to certain forms of abnormal drowsiness and somnolence, which I believe many physicians have had some experience with, but concerning which little has, of late years, at least, been systematically written. I do not mean the somnolence of indolence, obesity, bad air, or organic disease, but I refer to certain peculiar forms of morbid sleepiness which are dependent upon some constitutional, and generally neurotic, taint.

The first writer upon this subject was a physician of the first century, Aretæus, who left two books upon "The Lethargics." Galen, his contemporary, also made many references to abnormal somnolence and lethargy. On the other hand, as Mr. More Madden well says, at the present day we find that in the five large volumes on nervous diseases in Ziemssen's *Cyclopædia* there is barely a reference to this subject. Perhaps we are more wide-awake than we were seventeen centuries ago.

I have been able to find reports of only about fifty cases of morbidly prolonged somnolence. Nearly all of those reported previous to 1878, are cases of what have been termed trance-sleep, or lethargy. Since the above date, when Gelineau called attention to a disease which he called nar-

colepsy, other and more peculiar forms of somnolence have been placed on record.

In my own experience, I have seen five cases which come under the head of morbid somnolence, and to these I can add two cases, the notes of which were kindly furnished me by Dr. L. Putzel, of this city.

A study of these cases which I have collected shows some curious perversions of sleep.

A married woman in good health, active, but somewhat advanced in years, was subject to continual attacks of drowsiness and sleep, so that she had to have an attendant with her whenever she went out to call or to walk. This condition lasted for years.

A girl, says Lesegue, while sitting in church, felt an irresistible desire to go to sleep. Such sensations have been felt by others, but not manifested in this same way. She went home and decently retired to bed, where she fell asleep, and did not wake up for three days. She subsequently often had similar attacks. It was certainly a unique illustration of the persistent hypnotic effect of Biblical exegesis. A married man of forty, while out in a field hunting, in the midst of the excited expectation of the prospective game, sat down and slept for three hours. He could only be aroused by the de-mesmerizing process of his wife, who, it was subsequently found, could send him to sleep and wake him up at her own sweet conjugal will. He lived for many years under this morphic sway of his too-soothing consort.

A young officer in the British army, says Madden, slept so long every day, that he was forced to resign his commission. This was not due to laziness, but was explained in politer terms as an idiosyncrasy.

A patient of my own, a healthy young salesman, was subject to periodical attacks of somnolence. He would go to

bed at the usual hour feeling well, and could not be roused until 12 M. or 6 o'clock P. M. the next day. These attacks would last for a week or ten days. During them his mind appeared to be disturbed.

A prominent clergyman in New York City used to be constantly overcome with sleep while writing his sermons, or engaged in any other mental work.

Gelineau tells of a man who was subject to frequent and annoying attacks of drowsiness or sleep. Whenever he was in a most expectant or interested condition, when about to dine, when going to the theatre, when walking in the street, he would fall sleep, and had to be pinched and drubbed till he awoke again.

A patient of mine, an active business man, while suffering from a train of neurasthenic symptoms, became the victim of an unconquerable and persistent drowsiness, which obliged him finally to leave his work.

These are some of the illustrations of the perversities of sleep. The cases which I have collected include those of trance lethargy—the sleeping men and girls, as they are called. They include also some of the cases of hysterical and mesmeric sleep. Moreau, Briquet, Bourneville, and Richer have reported altogether a good many cases of this latter kind, which I have not tried to quote. And they show that this form of morbid somnolence, though more common than other forms, is still comparatively rare. Briquet, among over 400 cases of hysteria, met three cases of prolonged somnolence and eight of lethargy. He makes a distinction between these terms, as do others, and very properly. In lethargy the condition of unconsciousness is generally more profound, the reflexes are abolished, and the patient cannot be roused. As a case reported by Gairdner shows, a patient may even have periods of sleep within the lethargy. Nevertheless, the two states are very

closely allied clinically and pathologically. And in some instances the patient is part of the time simply in deep sleep, at other times in complete lethargy. I have thought best, therefore, to consider the two states together under the common title of prolonged or morbid somnolence.

I have already said that the various forms of morbid drowsiness and somnolence to which I call your attention, do not include the common and simple cases, such as occur in every-day practice. Many persons are too drowsy after meals, and perhaps too sleepy on cold mornings or after midnight indiscretions, to be in a perfectly healthy state. There are many forms of drowsiness due to old age, to organic disease, to obesity, to diabetes, and to cerebral vascular disease.

I enumerate these causes here, and exclude them as the chief pathological factors in my cases. These latter I consider to be in the main expressions of some neuropathic state; to be, in fine, neuroses.

The causes of ordinary forms of drowsiness and somnolence are :

1. Old age, when there is a weakened heart or diseased arteries, with cerebral mal-nutrition.
2. The diseased vascular conditions which precede cerebral hemorrhage.
3. The cerebral mal-nutrition or inflammations occurring before or during certain forms of insanity.
4. Various toxæmiæ, *e. g.*, malarial, uræmic, cholæmic, syphilitic.
5. Dyspepsia.
6. Diabetes.
7. Obesity.
8. Insolation.
9. Cerebral anæmia and hyperæmia.
10. Cerebral tumors and cranial injuries.

11. Exhausting diseases.

12. The sleeping sickness of Africa.

Of course, I cannot deny that in some cases of the hypnotic neurosis certain of the above factors enter. But I look upon them as secondary.

In studying *the symptoms* in the various cases which I have collected, I find that the somnolence shows itself in very different ways :

I. Sometimes the patient suffers from simply a great prolongation of natural sleep. He sleeps fourteen or eighteen hours out of the twenty-four. When awake he is not drowsy. His attacks may daily succeed each other (periodical prolonged somnolence). This may be continued for some time.

II. Sometimes the patient suffers from a constant persistent drowsiness, which he is often obliged to yield to. (Persistent drowsy and somnolent condition, with some remissions.)

III. Again, the patient may be subject to frequent brief or comparatively brief attacks of somnolence, not being drowsy in the intermissions.

IV. In some cases there are single or repeated prolonged lethargic attacks. These are the cases which often become notorious, as sleeping or fasting girls. But it also includes others of a less marked type.

V. Finally, some patients—and they include the largest number—suffer from periodical attacks of profound somnolence or lethargy, which last for days, weeks, or months. If they continue for months they are generally interrupted by very brief and incomplete remissions.

In these different conditions, the accompanying symptoms necessarily vary much. As a rule, the health of the patient finally suffers. Morbid somnolence may be much more serious than insomnia. Sometimes the consciousness

during the attacks is not entirely abolished. In the epileptoid and hysteroid sleep, and in the lethargic states, the pupils are generally dilated instead of contracted, as in normal sleep. In deep lethargy the reflexes are abolished.

The diseased condition is generally a chronic one, lasting for years. It may end in insanity, suicide, or in death from mal-nutrition or starvation. In certain forms of somnolence, however,—especially those of a hysterical nature,—the patient's health does seem to suffer.

I do not find that a clinical classification is alone a sufficiently useful one. Morbid somnolence is, of course, a symptom, and, in the cases which I am considering, a symptom of some neuropathic condition. I have tried, therefore, to classify the cases in accordance with the pathological state which we may assume to be at the bottom of the trouble.

One very soon sees that most cases of functional morbid somnolence are closely related to the epileptic or hysterical diathesis.

We have, therefore :

I. The epileptoid sleeping states, some of which seem to correspond to *petit mal*,—some to *haut mal*.

II. We have also the hysteroid sleeping states. These include the lethargics and the sleeping-girls, but also individuals who are subject to short attacks of sleep and even persistent drowsiness. They should include, also, the victims of spontaneous or provoked mesmeric sleep.

III. Finally, there is a class of cases of a puzzling nature. We find no history or evidence of epilepsy or hysteria in them ; and though we may call them epileptoid or hysteroid, it is certainly but a make-shift to do so. The patients seem to be the victims of a special morbid hypnosis. Possibly they have a cerebral hyperæmia or anæuria. Some of them simply feel a morbid necessity for sleep, and

do sleep twelve hours or more out of the twenty-four. Or they are oppressed by a continual drowsiness or by frequent attacks of somnolence, or even by attacks of long and profound lethargy.

The predisposing causes in these forms of somnolence are chiefly a neuropathic constitution, which is in some cases acquired, in some cases inherited,—sometimes the disease itself seems to be directly inherited. The epileptic and hysteric diatheses, are found with especial frequency. As regards sex, it is only in those cases where the morbid sleep is apparently a pure hypnosis that the males are more susceptible. In the other forms the ratio of females to males is about as four to one, which is considerably less than the ratio in hysteria. The age at which the trouble appears varies between eleven and forty-seven. Most cases occur between the ages of twenty and forty. The hysteroid cases are materially younger.

This may be shown by the accompanying table:

	Total No.	Age.	Sex.
Epileptoid. Sleeping States.	11	15-30=6. 30-40=65.	Male 4. Female 7.
Hysteroid. Sleeping States.	26	16-32.	Male 5. Female 21.
Other Forms.	12	12-40.	Male 9. Female 3.
Total.	49		Male 18. Female 31.

The exciting causes are difficult to determine. Violent emotions, fright, injury, great exhaustion, over-work, excesses, appear to bring on the attacks in many instances. Habits of indolence may finally end in producing a degree of drowsiness, which is certainly morbid.

Treatment.—"Lethargics," says Aretæus, "are to be laid in the light and exposed to the rays of the sun (for the disease is gloom); and in a rather warm place, for the cause is congelation of the innate heat."

Noises to arouse the patient, cupping, blisters, and rubefacients, sternutatories of castor, emetics, and purges are recommended, by that author and by Galen.

Modern therapeutics has not advanced greatly beyond Aretæus in the treatment of lethargics. In the other and slighter forms of the disease, however, we can do much more. We can, for example, remove cerebral anæmia, or hyperæmia, improve the general nutrition, reduce obesity, correct the diabetic troubles, and greatly relieve the epileptic or hysterical taint.

We can and should exclude such factors as malaria, uræmia, cholæmia, dyspepsia, or syphilis. If there is anæmia, we should use iron, arsenic, nitrite of amyl, glonoin, digitalis, hydrotherapy, electricity, and general hygienic measures and tonics. Change of occupation or travel and a course of mineral waters at some resort have proved successful.

As symptomatic remedies we can recommend coffee, caffeine, coca, belladonna, nitrite of amyl, and sternutatories. Laycock's sternutatory, composed of powdered cinchona and white hellebore, is an excellent one. The ancient authorities, like Galen and Aretæus, recommend castor.

In hysterical cases, tartar emetic has been very successfully used.

Systematic and persistent attempts should be made to break up the special somnolent attacks. Some cases need to be fed with the stomach-tube.

Having reviewed the general features of the morbidly somnolent states, I now present the history of a few cases which came under my own experience. Two of them I have briefly alluded to. None of them, I believe, come under the head of epileptoid sleeping-states. Two occurred in persons who presented the symptom-complex known as neurasthenia. One was a case in which the som-

nolent attacks alternated with attacks of cataleptic *petit mal*, while the fourth is a case which I can only classify as being a separate morbid neurosis.

The history of this last case, which was the most interesting as well as perplexing to me, is as follows:

CASE I.—The patient is a young man, twenty-eight years old, unmarried. There is a history of phthisis in the family but no nervous trouble of any kind, except that a younger brother had when about ten years of age several general convulsive attacks, probably epileptic, which later disappeared entirely. The patient himself when a boy had eczema, and when about twenty years old suffered from a loose cartilage in the knee-joint and dropsy of the same articulation. From this he entirely recovered in a year or two. Aside from these things he has always been well.

He had always been a late sleeper but when awake was bright, active, intelligent, and of excellent business capacity. There was not the slightest evidence of hysteria about him, though he has some unobtrusive mental peculiarities. About eight years ago his family began to have serious trouble in getting him up in time for his work in the store where he was a salesman. He would be easily roused mornings but would go to sleep again and would not get out of bed, despite all arguments and urging, until ten, eleven, or twelve o'clock in the morning.

The trouble seemed to grow upon him until finally he would stay in bed all day, getting up at about five or six o'clock in the evening.

The severer attacks of somnolence came on periodically. He would get up at a tolerably good hour for two or three weeks. He would then, after going to bed at the usual hour, about eleven or twelve o'clock, stay in bed till noon or evening of the next day. He would repeat this for several days and would then get up at the ordinary hour. The frequency and severity of the attacks have of late been increasing. When awake and up he seemed as bright as ever and apparently felt well. He states that he goes to bed feeling as usual and expecting to get up to his work. The next morning, however, he is unable to do so. I saw him several mornings when in this lethargic state. He could easily be roused to a certain extent, and could be made to sit up in bed, but his mind seemed to be in an abnormal state. If urged to get up he would only say: "Yes, yes, I'll get right up." If pulled out of bed

and made to begin dressing himself he would perhaps do it slowly and mechanically. If urged harshly he would whimper like a child, and when possible he would get out of the room and lie down elsewhere. If closely followed up and watched until dressed and gotten down-stairs he would finally get into a normal state of mind. When examined by me some months ago he seemed in perfect physical health, except for a slight dyspepsia. He had no headaches or vertigo. His heart, lungs, and kidneys were normal. His pupils are even and not large. He did not have sugar in the urine, nor is he at all fleshy or obese, rather the contrary. He drinks and smokes very moderately. Has emissions only about once a fortnight.

The attacks naturally suggested the possibility of nocturnal epilepsy, drinking, or masturbation. The most careful inquiries and investigations enable me to exclude these.

I am forced to believe that his condition is an idiosyncrasy which habit has developed into a morbid neurosis.

CASE 2.—The patient in this case was a gentleman who came under my observation eight years after his attacks of somnolence. He was a business man, of a healthy family history, who had himself been tolerably well up to about ten years before. At that time he had a train of nervous symptoms which would be called neurasthenic. While still suffering from them he became the victim of an intolerable and persistent drowsiness. It interfered with his business, and he finally went away for a few months. Rest and life in the country restored him.

He came to me about nine years later with neurasthenic symptoms, which interfered greatly with his comfort and capacity to work. He was a spare man, quiet in manner, yet evidently of a nervous temperament. He stated that at the time when he suffered from somnolence, he had no hepatic or renal or any organic trouble so far as he knew. Somnolence was not one of his symptoms when I saw him.

Whether this attack was due to cerebral anæmia, or hyperæmia, or to any disturbances of the abdominal viscera, or whether it was simply a symptom of his nervous asthenia, I cannot say. When I was treating him he used to pass very large quantities of limpid urine, after exacerbations of his symptoms, but it contained no sugar.

CASE 3.—This patient also came under my treatment a few months after the severer symptoms of her somnolence appeared.

She was a married woman, aged forty-five, who had always been healthy, and was the mother of several healthy children. Of late she had had much domestic trouble and worry. About six months before I saw her she had suffered a great deal from "nervousness," weakness, and various vaso-motor disturbances, the most prominent being profuse sweating. She at this time began to be very drowsy at times. She would go to bed early and sleep till late in the morning. She would also sleep several times during the day, and at any time could sit down and fall instantly asleep.

When I saw her in January, 1883, she still slept more than the ordinary length of time, but did not suffer so much from drowsiness in the daytime.

She was a well-nourished woman, not especially anæmic. She complained of extreme nervousness and weakness and a constant sweating, also of some digestive troubles.

She had no discoverable organic disease; the urine was normal and the bowels regular. She had more markedly the symptoms of general nervous asthenia than of hysteria; that is to say, she had no globus, no spasmodic troubles, no great emotional disturbances. I could find no toxæmia or organic trouble which would account for her somnolence, although in this case the hypothesis of a cerebral anæmia might be brought in.

CASE 4.—F. S., age fifteen, came to me in January, 1882, suffering from paralysis of the left arm. She was a fleshy, robust-looking girl with ruddy complexion. Her parents were healthy, and she herself had always been well until a few months previously. She then began to have attacks of unconsciousness, lasting from a few minutes to half an hour. These were preceded by clonic spasms of the left hand; when she came out of her attacks this hand was tightly clenched. The arm grew gradually weaker, and when she came to me it was nearly helpless, although she could move her fingers; the attacks referred to had ceased. Examination of the affected arm showed slight anæsthesia and vaso-motor disturbance. The electrical reactions were normal. Under treatment the paralysis gradually disappeared. During the time of treatment, and for some months subsequently, she complained of persistent drowsiness. She slept twelve hours at night, and in the daytime took frequent naps; she could lie down and sleep at any time. There was no uræmia or other toxæmia, and the bowels were regular. The somnolent tendency left her very nearly with the paralysis.

In conclusion I present a case illustrating a condition of "cataleptic petit mal," as Richer calls it, and mesmeric somnolence. The girl was one whom I could undoubtedly have mesmerized if I had thought it wise. The case illustrates the close relation between hysterical attacks of sleep and of catalepsy.

CASE 5.—Miss Fanny H., age seventeen. Family healthy. When a child had severe attacks of syncope, or "fainting spells," as she called them. Otherwise, was healthy though somewhat delicate. Is well-developed; menses regular, but has suffered from dysmenorrhœa, for which she was successfully treated.

In March, 1883, while with her companions at recess, she suddenly felt her left hand being spasmodically twitched; she then appeared to lose consciousness, sat down, closed her eyes as though in sleep. In about ten minutes she roused spontaneously, and declared that she had been conscious of every thing, but was helpless. For some hours after this she felt weak and tired. A few days later a similar attack occurred.

The attacks then began to recur very often; sometimes she would have them once or twice daily, sometimes only once or twice a week. They occurred generally when she was at school and while engaged in study. Her left hand would begin to shake, constituting a kind of motor aura. If the hand were seized and held by her companion, she could often keep the attack off. If the attack came on the face would get paler; the eyes generally, she says, remained open.

As a rule, she continued sitting upright in her seat. Sometimes, however, her head went forward upon the desk, and her teacher would think she had fallen asleep.

She came under my treatment in April, 1883. She was then a somewhat delicate-looking girl, intelligent, studious, and not markedly nervous or hysterical in manner. She was found to be perfectly healthy as regards the thoracic, abdominal, and pelvic viscera.

While visiting me she had one of her attacks. The left hand shook, the eyes then closed, the body relaxed, and she seemed to be in a kind of stupor or sleep. She could not be aroused by any ordinary stimuli, although the reflexes were not abolished. In about fifteen minutes she returned to a normal condition, and then asserted that she had been conscious of every thing. I

treated her with tonics, bromides, electricity, spinal douche, etc. She improved somewhat, and, being finally through her school work, the attacks stopped.

The next fall she started to begin study again, when she had another attack, and then gave up study. Since then she has been perfectly well.

This patient had attacks, some of which appeared to observers to be attacks of sleep; in other cases they were more of a cataleptic nature. The initiatory movement of the hand suggests a *petit mal*, or aborted epilepsy, but the preservation of consciousness and other points in the history, such as her prompt recovery, are against this.

The attacks were evidently of a hysterical nature, sometimes resembling those of morbid somnolence; oftener those of catalepsy.

The case resembles in some points that reported by Gelineau as a case of "narcolepsy," and furnishes a kind of connecting link between some of the narcolepsies and catalepsies.

In addition to the cases thus related, I present two, of which the notes were kindly furnished me by Dr. L. Putzel, of New York City.

CASE 1.—The patient was about twenty years old, and had been subjected for a couple of years to attacks of falling asleep for a few minutes in any position, often while standing, and when not tired. There did not appear to be any thing pathological about them except their occurrence when the patient was not tired. She married at about the age of twenty-two or twenty-three years, and then began to suffer from infrequent, well-marked epileptic attacks. Her brother subsequently came to me, also suffering from epilepsy. The patient herself appeared to be entirely healthy in all other respects.

This case clearly illustrates the epileptoid sleeping-state, and is similar to those reported by Westphal, Fischer, Porter, and others.

CASE 2.—The second case was that of a patient married, about thirty years old, who suffered from all the evidences of general anæmia. In addition, she was always excessively drowsy, and at times would fall asleep standing up. Dr. Putzel regarded this as evidence of cerebral anæmia, and the patient recovered under the use of iron and nitrite of amyl.

To my own and Dr. Putzel's cases, I add a brief resume of the others which I have found. Some exception may be taken to the classification which I have made of them, yet I believe that in the main it is correct.

I first present those which illustrate the epileptoid sleeping-states.

I.—*The Epileptoid Sleeping-States.*

CASE 1.—A young woman, aged twenty-six, had had epileptic attacks three years before. These had ceased and her health appeared good. She was seized with attacks of somnolence with dilated pupils; normal temperature; quiet breathing. She could not be awakened, but awoke spontaneously after 12, 16, 18, or 24 hours. Once she slept for twelve days. Lately she had slept two thirds of each day. (Rahlman: *Berlin. Klinisch. Wochensch.*, *Brit. Med. Jour.*, April 2, 1881, p. 527.)

CASE 2.—A young woman, aged twenty-two. Sister had the same trouble for a time but it disappeared spontaneously. Well until six years ago, when her voice became weak and hoarse. After this, there supervened attacks of somnolence—two to six daily, lasting five to sixty minutes. They would attack her at any time. They were most frequent at her menstrual period. Consciousness was sometimes partially, sometimes entirely, lost. When the attacks first began she had some slight preliminary muscular twitchings; later, she had peculiar feelings like an aura. General health good. Case attributed to fright. (Reported by F. Fischer, Jr.: *Arch. f. Psychiatrie*, Bd. viii., p. 200.)

CASE 3.—Sister of case 2. See above.

[Fischer considers this case epileptoid, but it might well be of a hysteroid or cataleptoid nature.]

CASE 4.—The patient was a man aged thirty-seven, who had had syphilis. He had an attack of mania; was taken to hospital. Recovered, but showed much mental weakness. He was then attacked with somnolent seizures. He would suddenly fall into a sleep lasting ten to thirty minutes. This occurred every day, or only once a week. He was apparently in ordinary sleep, but was anæsthetic; reflexes lost. The attacks were accompanied by vaso-motor disturbances, especially those showing irritation of right cervical sympathetic. The attacks ended in sweating. (E. Mendel: *Deut. med. Wochensch.*, 1880, p. 226.)

[The syphilis might have been at the bottom of this.]

CASE 5.—The patient was a man, a book-binder, aged forty. (Westphal: *Arch. f. Psych.*, Bd. vii., p. 656) Mother has attacks similar to the son's. After a powerful excitement, he had an attack in which he lost speech, with great trembling and weakness. After this he suffered from two classes of attacks. In one he would suddenly reel like a drunken man, then fall, his jaw twitching, eyes half open, respiration hastened. At the end he would have a movement from the bowels. He said he was conscious all the time.

In the other attacks he would suddenly be seized with drowsiness, alone or in company, or when on the street. He would sleep until wakened accidentally or otherwise.

CASE 6.—Mother had similar attacks as son. (See above case 5. Westphal.)

CASE 7.—A woman aged forty. Mother and sister epileptic. Had suffered many years from attacks of neuralgia. Finally she had a very severe attack of neuralgia with insomnia. After this passed away, she suffered from attacks of somnolence alternating with vertigo. On one day she would suffer from the somnolence, on the other from vertigo. These attacks of somnolence occurred six or seven times daily, but lasted only two to five minutes. After several days of alternating somnolence and vertigo, she would remain free from any symptoms for a week or more. (R. H. Porter, *Medical Record*, Nov. 27, 1880, p. 610.)

CASE 8.—A girl aged eighteen, of neurotic family, well-nourished, inclined to corpulence. No symptoms of hysteria and no convulsions. Subject to severe headaches for several years. About a year ago became subject to attacks of somnolence, at first rare, later every few days. She would have a headache, and then pass into a sleep lasting several hours. At other times, while suffering from headache, she would have several short attacks of sleep lasting a few minutes.

At other times, instead of going to sleep, she would pass into a kind of somnambulant state (epileptic cerebral automatism), and would do her routine work unconsciously and automatically. Her cousin was a sleep-walker. (R. H. Porter, *vide loc. cit.*)

CASE 9.—The patient was a man aged thirty-eight. Family and early personal history good. No syphilis. Married, and had two children. Moderate drinker. Had had acute articular rheu-

matism. Three years ago had a fight and a fall. Two years ago his symptoms began. He would fall asleep whenever he undertook to eat, walk, go to theatre. Any thing particularly exciting his attention would throw him into a sleep. He would sleep a little, then wake. He had one or two attacks daily, accompanied by dizziness. He often had attacks of dizziness. Intelligence, memory, and consciousness were not lost during the attacks. (Gelineau : *Gazette des hôp.*, July 8, 1880.)

[This was the case originally published by Gelineau as one of narcolepsy. He does not consider it as epileptoid, but as a distinct neurosis. I place it here as being clinically most like other epileptoid cases.]

CASE 10.—A woman aged thirty-five, healthy in other respects, had short attacks of somnolence daily. They lasted about ten minutes. (G. Ballet : *Revue de médecine*, Nov., 1882.)

[This case, too, which I do not report in full, cannot be certainly considered as epileptic.]

CASE 11.—Putzel's. (See *ante*.)

II.—Cases Illustrating the Morbid Somnolent Neurosis.

CASE 1.—My own. (See *ante*. Case 1.)

CASE 2.—A young officer could not possibly get along without fourteen hours of sleep. He slept until noon every day and lost his commission in consequence. (Quoted by T. More Madden : *Dublin Journal of Medical Sciences*.)

CASE 3.—The patient was a woman aged fifty-two. Her grandfather was *très dormeur*, otherwise her family and personal history were good. For several years she has had an unconquerable tendency to sleep. At night she sleeps like others ; in the daytime she has from three to six attacks of somnolence. These are more frequent at the menstrual epoch. (G. Ballet : *Revue de médecine*, Nov., 1882, p. 945.)

[This case is clinically somewhat like some of the epileptoid cases, yet there is no evidence furnished that there is any epileptic taint.]

CASE 4.—A wine merchant, aged twenty-eight. Family history good. Always had a tendency to sleep in the daytime. When

three years old had typhoid fever, which was followed by seventeen days of lethargy. Suffered from headaches. In the last two or three years the attacks of somnolence and drowsiness have been increased. Has difficulty in keeping awake during work, or even while waltzing. Sleeps very heavily and long at night, and is hard to waken. No albumen or sugar in the urine. Improved somewhat under hydrotherapy. (G. Ballet *vide loc. cit.*)

CASE 5.—The patient was a man aged forty-seven, married. Family and personal history good ; a clerk ; sober. For a year he was subject to attacks of somnolence, and had to give up his employment. He was large and corpulent. He was of fair intelligence but slow.

Under treatment he improved, then relapsed. Later he seems to have become insane, or to have had a chronic meningitis. (Caffe : *Fourn. des connaissances médical pratique*, Aug. 20, 1862.)

[Caffe considered this at the time a case of passive cerebral congestion with serous effusion. Gelineau thinks it was a distinct neurosis. The termination of the case, though occurring years later, rather points to some organic trouble.]

CASE 6.—J. M., a man aged thirty-nine, good constitution and family and personal history ; plethoric ; a farmer. Twelve years before was exposed to rain and wet, with the result of getting severe pains (rheumatic ?). Under treatment these all disappeared except at base of skull and back of neck. After the general pains or neuralgiæ had disappeared, he observed that, especially after eating, an irresistible tendency to sleep set in, accompanied by heaviness of the head and general dulness of disposition. During the second year of his illness the attacks of somnolence occurred frequently—twenty or more times a day—always preceded, however, by an aggravation of pain at the base of the cranium and cervical region. A peculiarity about these neuralgic pains was that they lasted for a very short time, and left him with the sleepiness only, which deprived him of a great deal of valuable time. Toward convalescence these neuralgic and sleepy attacks diminished in frequency, being limited to five or six spells a day. (E. Paz : *Cronica Medico-Quirurg.*, Havana, 1876, p. 328. Quoted by Dr. Matas.)

[The case might have been syphilitic.]

CASE 7.—Jose, a young Mexican herdsman living near Matamoros, Mexico. He had been a bright, active, healthy fellow. After a long ride on a hot, sunny road, one and a half months previous, he began to show a disposition to somnolence. He slept late in the morning, again in the afternoon. Finally he slept twenty-four to forty-eight hours, with brief periods of wakefulness. Had no headache or fever; pulse and respiration and skin appeared normal in the attacks. No evidence of renal disease. He could be aroused, but would fall asleep again. Sleep seemed natural and calm. (Dr. Rudolph Matas: *New Orleans Med. and Surg. Jour.*, Jan., 1884.)

[While this was probably a neurosis, we cannot positively exclude diabetes, uræmia, or the effects of insolation.]

CASE 8.—A boy aged twelve, much overgrown; weight, one hundred and fifty pounds; height, five feet six inches. An aunt is epileptic, and his mother a sufferer from neuralgia.

Nine months before he was seen by Dr. Porter he began to suffer from attacks of somnolence. They began at 9 A.M., and continued forty-eight hours. He could be roused, but would fall asleep again. Would take no nourishment. After they had passed off he felt tolerably well. They came on monthly at first, then became more frequent. He showed symptoms of neurasthenia. For these he was treated, and gradually recovered. (Robert H. Porter, M.D.: *Med. Record*, Nov. 27, 1880, p. 610.)

[Dr. Porter considers this a case of epileptoid somnolence; but this is hardly satisfactory, not being clinically like most of such cases. It was more likely a nutrition disturbance.]

CASE 9.—Farmer, age forty-three; for nineteen years was subject to attacks of somnolence, coming on without appreciable cause. He was a healthy man otherwise, and intelligent. No hysteria. His attacks last two to five days, averaging two days. The disorder came on in 1842, lasted a year; again in 1848, lasted one and a half years; again in 1860. During sleep he is pale, feet and hands cold, pulse slow and feeble. Awakes refreshed. In 1878 had trismus after the attacks. Since last attack has become weaker. Dr. Cousins reported in 1865 that his patient was still suffering from the abnormal attacks, and was weaker and less interested in business, otherwise well. (Dr. J. W. Cousins: *Med. Times and Gazette*, April 18, 1863, and July 27, 1865.)

[This case resembles those of hysterical trance lethargy, but there is no reason for calling it "hysterical" except the symptom morbid somnolence.]

Hysteroid Morbid Somnolence.

The cases of morbid somnolence and lethargy occurring in hysterical persons and in hysterio-epileptics are, comparatively speaking, quite numerous. This is especially the case if we include under this head the various instances of trance lethargy which have been related. Yet for all this, morbid somnolence is not absolutely a frequent phenomenon, as has been already stated.

In looking over the history of the cases of prolonged sleep in persons of a hysterical diathesis, we find that the disease shows itself in several markedly different ways.

Thus there is a set of cases of trance lethargy so-called, in which the patients are plunged into a deep and prolonged unconsciousness, lasting from one day to several years. These are "sleeping girls," and fasting girls.

Another class includes those who apparently are the victims of a too ready susceptibility to hypnotism or mesmerism.

A third class includes the patients who suffer from somnolence or drowsiness in other irregular forms. These patients are evidently hysterical, but their somnolent symptoms appear in peculiar ways.

I have collected and give below brief references to the cases of trance sleep or remissive lethargy which have appeared in medical literature in the past years.

I do not include those cases which are cataleptic in their nature, although there is undoubtedly a close relation between the cataleptic and ordinary forms of lethargy.

CASE 1.—A woman, aged twenty-four, large, well formed. At the age of eighteen; she fell into a trance sleep lasting forty days; at age of twenty another attack lasting fifty days. All the

latter time she was insensible, could not be roused, and had to be fed. When twenty-eight years old she fell into another lethargy, which lasted several months. The respiration was very shallow, pulse slow, organic life at a low ebb. (M. Blondet : *Ga. hebdomadaire*, October 28, 1864, p. 726.)

CASE 2.—Young lady, aged nineteen, apparently well ; suddenly attacked with lethargic sleep, resembling syncope ; was occasionally aroused for a time. After nine days suddenly awoke. (T. More Madden : *Dublin Medical Journal*, vol. 71, 1881, p. 297.)

CASE 3.—A young woman, aged eighteen, slept forty days, could not be roused, was fed. At age of twenty, slept fifty days. At age of twenty-four, slept twelve months, being fed. Pulse slow and weak. Respiration almost inappreciable. (Blondet : *Med. Times and Gaz.*, Nov. 12, 1884, p. 519.)

CASE 4.—R., a soldier, age twenty-five. Two years before, in July, 1870, after a struggle with a comrade, fell into a sleep for seventy-four hours. He then had attacks as follows : November, three days ; March, 1871, five days. In subsequent year he had three attacks for two or three days each.

In the attacks, the pulse was 84 ; resp., regular. He had a peculiar hyperæsthesia ; stimuli would provoke *spasmodic* movements. (M. Mendel : *Lyon médical*, Oct. 27, 1872.)

CASE 5.—“A young woman in perfect health suddenly experienced such an irresistible desire to sleep that she sought refuge in a solitary and unfrequented place to realize her inexplicable desire unmolested ; her sleep lasted eight consecutive days, when she was awakened by the great stir and noise produced by a number of persons who surrounded her. She was very much weakened by this prolonged fast, and death would have been certain if the sleep had not been interrupted.” (Fournier : *Diction. des sciences méd. Cas rares*. Quoted by Matas.)

CASE 6.—A young lady, aged seventeen, while in church was suddenly seized with a desire to sleep. She went home, went to bed, and slept three days. No catalepsy. She awoke, was well for a month ; then went into a sleep again. (Laségue : *Gaz. des hôp.*, Jan. 3, 1882.)

CASE 7.—A girl went into a room by herself, and was found shortly after in a state of trance sleep, which lasted thirty-eight hours. (W. R. Gowers : *Quain's Diction. Médecine*.)

CASE 8.—A woman of twenty-seven, of small stature and weak mentally, was admitted to London Hospital for heart trouble.

She passed into a lethargic trance. There was no rigidity or cataplexy. Could be aroused somewhat. Had to be fed with tube. Pulse normal, pupils large, lungs normal, no reflex action. (Dr. L. Doure : *Brit. Med. Jour.*, May 3, 1879, p. 827.)

CASE 9.—Mrs. M., aged thirty-two, mother of six children, of good family and personal history. Had had no symptoms of hysteria. Six weeks after confinement she suddenly fell into a trance sleep, which lasted for several months. Reflexes were not quite abolished at first, and could then swallow food. Later she had to be fed. She slept within her trance, *i. e.*, at night she would snore. No cataleptic or other rigidity. She had some color. (W. T. Gairdner : *Lancet*, Dec. 22, '83; Jan. 5 and 12, 1884.)

CASE 10.—A young lady, age twenty, previously healthy, was found one morning in a state of profound sleep, from which she could only be aroused by bleeding; next morning the same. After several mornings left alone, slept thirty hours; awoke refreshed. Later often sleeping thirty to sixty hours. Finally became insane. (Cooke's "Treatise on Nervous Diseases," vol. i., p. 372.)

CASE 11.—The sleeping girl of Trouville. At the age of eleven she fell into a sleep or lethargy which continued for ten years. She could be roused enough to swallow food. (Mr. Haymen : *Lancet*, June, 1881.)

CASE 12.—A girl who had been for some time in a lethargy was sent to London Hospital, and treated there with tartar emetic, by which she was speedily cured. (John Gay : *Lancet*, July 3, 1880, p. 31.)

CASE 13.—A similar case to that of Gay's is reported by Gairdner, of a girl who had attacks of lethargy alternating with violent choreic movements. The whole turned out to be a case of hysterical malingering. (*British Med. Journ.*, May 4, 1878.)

CASE 14.—The patient was a single woman, known generally as "Sleeping Effie." She used to wander about for miles, then go home, and fall into a sleep lasting one to five weeks. Attacks continued for fifteen years. She finally died of exhaustion after sleeping three weeks. (Dr. James Edwards : *Lancet*, vol. i., 1848, p. 309.)

To the above cases we must cite three more briefly referred to by Mason Good (*vide op. cit.*) as cases of "ab-

solute lethargy." In one case the patient slept forty days ; in another, forty-nine days ; in the third, three days, then six weeks, then three days. The last patient finally committed suicide, and probably was then insane.

Cases of lethargy are also reported by Wyatt (*Med. Times and Gazette*, vol. i., 1865, p. 111) and by Gimson (*British Med. Journal*, July 13, 1863).

Mesmeric or Hypnotic Somnolence.

We now come to a class of hysterical cases in which the sleep is more plainly of the mesmeric character. Sometimes it is provoked, at other times it comes on spontaneously.

Richer and Bourneville have shown how susceptible hystero-epileptics are to provoked attacks of somnolence, and I simply refer to the former's work on hystero-epilepsy without attempting to cite cases.

It is certain, however, that spontaneous mesmeric sleep occurs in those who are not hystero-epileptics. This opinion is confirmed by the fact that a young girl who had been a few times hypnotized by Hansen became the subject of attacks of auto-mesmeric sleep, and applied to Finkelnburg for treatment. (*Berlin klinisch. Woch.*, No. 3, 1884.)

Lesegue cites the following three cases :

CASE 1.—A rich farmer, aged thirty, married, went hunting one day, and fell down in a field and slept for seven hours. Next day did the same, and continued to have attacks for a long time. Lesegue was called in, and saw it was a hypnotic sleep. His wife found out that she could put him in or out of sleep, and amused herself by doing so.

CASE 2.—A young lady used to fall asleep at 8 P.M. precisely no matter what she did or how much she slept.

CASE 3.—A Belgian countess, daily, for two years, fell asleep at 9 P.M., no matter what she was doing.

CASE 4.—An educated young woman, previously healthy, had attacks of somnolency lasting several hours, followed by loss of

all her previous knowledge, and return of same on the alternate attacks. This alternation continued for four years. In one interval she retained her original knowledge ; in another, only what she had previously learned. (Major Elder, of West Point. Good's "Study of Med.," vol. ii., p. 218.)

CASE 5.—The patient was a man aged forty-five, large, robust. The family and personal history were good. Had a large fistula. Any emotion or excitement would send him into a sleep, during which he was sometimes conscious—*e. g.*, when a probe was passed into his fistula. (G. Camuset : *Gaz. des hôp.*, July 20, 1880.)

CASE 6.—Woman aged thirty-five. Healthy in other respects. Had attacks of sleep—ten minutes. Several daily. No epileptic history. (G. Ballet : *Rev. de médecine*, Nov., 1882.)

CASE 7.—Josephine F., aged sixteen. Family and personal history good. At the age of fourteen she experienced a great excitement and emotion. This was followed by hysterical contraction and deaf-mutism.

She became relieved of these symptoms, but on receiving a fright one day, they returned. Taken to a hospital she had attacks of sleep lasting twenty-four hours, alternating with contractions. (Ballet : *vid. loc. cit.*)

CASE 8.—A young lady of delicate constitution, aged eighteen, had been subject to great anxiety. She had attacks of somnolence lasting two or three hours and coming on two or three times a week. She recovered suddenly. (Good's "Study of Medicine," vol. ii., page 384.)

CASE 9.—See my own case, No. 5.

CASE 10.—Finkelnburg's ; *vide* above.

CASE 11.—A case is briefly described in *The Lancet*, vol. i., 1867, p. 532, of a spare, abstemious man, otherwise in apparent good health, who suffered from a continual drowsiness.

The writer inquired for a remedy and was advised by another correspondent to use belladonna.

CASE 12.—This case is referred to by Handfield Jones ("Functional Nervous Diseases," p. 405). A man, aged twenty-two, was ill for a year, suffering from continual drowsiness. His face was flushed, and there appeared to be a paresis of the cerebral vessels.

A few interesting cases illustrating somnolence from

organic brain disease, from great exhaustion, or from diabetes, may be briefly referred to.

CASE 1.—Ballet cites a case (*loc. cit.*) of a diabetic who suffered from persistent drowsiness and prolonged attacks of sleep.

CASE 2.—Matas cites a case (*loc. cit.*) of somnolence from syphilis probably.

CASES 3-4.—Buzzard (*Lancet*, June 7, 1879). cites two cases of this kind.

In these three cases there was persistent drowsiness.

CASE 5.—Matas also cites a case of persistent drowsiness and somnolence from a brain tumor. (*Loc. cit.*)

CASE 6.—Laycock cites a case of morbid somnolence from an injury to the head. There was no paralysis. He was cured by a sternutatory. Dying later, no lesion of the brain was found. (*Medical Times & Gaz.*, May 13, 1865, p. 489).

A. Weber cites a case of somnolence in a girl who suffered from hemiplegia and epilepsy. She had convulsive attacks followed by lethargic attacks, lasting for hours or days, and finally ending in hemiplegia. (*Brit. Med. Jour.*, Oct. 22, 1870.)

CASE 7.—Madden (*loc. cit.*) cites the case of a boy who passed into a soporose state, lasting forty-seven days, after an attack of typhoid fever.

CASE 8.—Also the case of a woman who, after confinement and typhoid fever, passed into a similar state, lasting twenty-seven days.

FEIGNED INSANITY : AN ENQUIRY INTO THE VALIDITY OF THE REASONS FOR RECENT DIAGNOSES OF THIS KIND.

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I N the present paper I do not propose to express any opinion as to the real mental condition of the individuals subjected to examination, but only intend to discuss the reasons assigned for supposing the individuals to have feigned insanity. The question of feigned insanity is not by any means as simple a one as the author of a recent publication on the subject of medical jurisprudence¹ would lead us to infer. The latter quotes *in extenso* and with approbation the remarks of an "authority," who starts out with the assertion that feigned insanity and moral insanity are convertible terms.² It will be obvious that a mind, which can so fail to grasp what is intended by moral insanity as to claim that all criminals who feign insanity feign this type only, is not one which is capable of logical analysis of the elements entering into the problem of feigned insanity. The physician who is called on to analyze a case in which simulation is suspected, and in which medico-legal issues are involved—especially if these last involve life,—should be conscientious about excluding *all* elements

¹ "Medical Jurisprudence," by A. McL. Hamilton, M.D.

² "Feigned Insanity," by A. E. Macdonald, M.D., *American Psychological Journal*, 1875.

of error. As an illustration of the points I propose to discuss, I shall cite the reasons assigned by Dr. A. Robertson for considering sane a man examined by him. Dr. Robertson¹ says, in his precognition: "I am of opinion that this prisoner is feigning insanity. The apparent indications of mental disorder shown by him are not consistent with real insanity. Thus at one time of each of the last two interviews he declared he had committed murder and was lying under that charge, and there was no hope for him and that he was eternally lost; while at another time he said that he had £400 in gold, that he expected to inherit from £4,000 to £5,000, and intended going to Callao, in Peru, where he resided some years; there he would purchase an estate, keep a riding-horse, and had no doubt he would get into the best society. At the last interview he asserted that the island of St. Helena belonged to him. These two kinds of apparent insanity are of totally different nature, and not met with in real unsoundness of mind in the same person at the same time. The one implies exaltation, the other depression; states of mind that do not exist together."

Now it has been the experience of myself and others, that when parietic dementia is engrafted on other psychoses, the latter leading to delusions of a persecutory type, the very phenomenon which Dr. Robertson declares to be inconsistent with real unsoundness of mind, is presented and the patient will give prominence to his persecutory or exalted delusions, as upon one or the other stress is laid by the examining physician. The parietic dement whose psychosis is complicated by phthisis, will show coincident with suspicious delusions produced by phthisis the exalted delusions of the first psychosis. It is therefore obvious, that from this standpoint Dr. Robertson's reasons for considering the man to be feigning, are decidedly not valid.

Dr. Robertson also ignores the fact, that upon persecutory delusions the paranoiac (monomaniac), often founds delusions of grandeur. He reasons that because of the imaginary persecutions he must be a king or a great inventor, and he will give prominence to the first at first, as supporting his claim, and latterly, to the grandiose delusions which he believes are thoroughly proven by the citation of the persecutory delusions. Dr. Robertson's statements are therefore too sweeping.

Dr. Robertson further says : " Further, his memory is good with regard to many things, such as remembering the names of places in Peru and Brazil, and the names of several firms by whom, he says, he was employed during this year ; yet at both my last interviews with him, which were nearly as long as my first, he declared he had never seen me before, unless it were some months ago, though I tried him both with my hat off and on and referred to incidents of the previous examination. Such correctness of memory in relation to variety of subjects and extraordinary blanks as to others, are not met with in real insanity in his age." It must be evident to the reflecting alienist that there are certain parietic dementia moods when events of the *immediate* past are forgotten, while the facts of the more remote past are remembered, and such being the case, it is obvious that as a test of insanity generally speaking, such a condition of things is valueless, while it may be admitted that there are certain *psychoses* with which such symptoms do not coëxist.

I now pass to a French case and in conclusion, shall point out the cause of these elements of error. Legrand du Saulle * in considering the case of Lemaitre, lays especial stress on the fact, that the latter recognizing the situation in which he had been placed, had decided on the construction of a fictitious insanity. He did not play his rôle well and would deceive no one. Now, Legrand du Saulle in laying special

stress on an attempt at feigning as evidence of sanity, ignores the fact that the insane, feign insanity for a purpose, as witness the following cases :

Ray,¹ in discussing the case of Trimbur, says: "Men who have been much conversant with the insane in hospitals—not meaning those whose knowledge consists in having seen many thousand patients—need not be told that some times, for one purpose or another, they make a show of being more insane than they really are. Many of the insane do certain things as well as they ever did ; they plan, contrive, anticipate in furtherance of a special purpose. The criminal classes to which most of these simulators belong know as well as any one else that the plea of insanity is one of the dodges whereby people now escape the punishment of their crimes, and they may not forget to act accordingly when they are insane. Trimbur being unconscious of his real insanity, but with mind enough to understand his situation, and to remember what he had heard about insanity in connection with crime, concluded to make a show of being crazy."

Dr. Hughes² has reported the case of a lunatic who committed murder, and feigned to be more insane than he was. He says: "The insane appear at times, when they have an object to accomplish, more crazy than, and different from, what they really are ; this is the sense in which we use the term simulation, and this condition is akin to that of feigning by the sane. Simulation, while it presupposes a degree of intelligence, does not require that the patient should be wholly sound in mind."

Dr. John P. Gray³ cites the case of a man who, two or three days before being admitted, was met in the woods going toward his father's, carrying a gun, and said he was "going to shoot the old man." When admitted, he said "he had been out of his head for quite a while ; should think twenty-four hours."

Dr. Workman⁴ has observed the case of an insane man who had escaped from his asylum, and killed his wife during an insane fit of jealousy; the man professed to the doctor to be completely amnesic while under trial for murder, denied that he had ever been under the doctor's charge, or that he knew any thing about the asylum. The doctor stated to the jury that the man was both simulating insanity and was insane. The prisoner was acquitted, and sent to the Criminal Lunatic Asylum, at Kingston, Canada. The doctor saw him there two years subsequently. He then fully recognized the doctor, and, in answer to a question, said that "he did not *want* to know the doctor" when previously examined by him. Had he been sane, he would, as Dr. Workman suggests, have known that sufficient proof of his past insanity could have been produced, and he would have abstained from his clumsy simulation, or he would have acted more cleverly.

Dr. Nichols,⁵ of Bloomingdale Asylum, New York, has observed the case of a man who committed murder under, as he believed, the command of the Virgin Mary, who appeared to him in the flame of a candle. Two young lawyers were assigned as his counsel; they advised him to feign insanity, which he did, under the form of dementia. The experts, Drs. Nichols and Ranney, detected both the sham and the real insanity, and had him sent to an asylum, where his insanity became unmistakable.

Morandon de Monteyel⁶ reports the case of a woman charged with murder who feigned insanity to escape the consequences.

Spitzka⁷ states that Dubourque, the Fourteenth-street New York woman-stabber, feigned forgetfulness of his crime.

The following cases recently occurred in Chicago⁸:

J. P., a hebephreniac, who had been imprisoned for disorderly conduct, was quiet and seemingly harmless. He was sent back

to the Bridewell to await trial for insanity, the law of the State requiring all the insane to be tried before committal to an hospital for the insane. He was placed in the same cell with C., who, when put in the cell, was drunk and ugly. The crowded condition of the Bridewell required two men to sleep in a bed, two feet wide and eight feet long. C.'s condition naturally inspired him with a notion that he was entitled to most of the bed. The result was a quarrel, in which P. was too weak to take an active part (C. was a burly fellow, six feet high) ; so he nourished his resentment until his bedfellow was asleep, and then sated his spite with the other's blood. One of C.'s legs was cut off, some years ago in a railroad accident. He wore instead a wooden stump, heavily shod at the bottom with iron, and attached to a sort of splint, which ran up to the thigh. This splint made a convenient handle for the murderer. P. had arisen stealthily in the night, and with the wooden leg's iron end struck C. on the head, which produced unconsciousness. Following this up, he made the murder a work of barbarous mutilation. When L., a deputy-turnkey, at six o'clock in the morning, came to the cell occupied by P. and C., he encountered P. in the door, who told him that there was no occasion for inspecting the cell, as every thing was all right. At this show of insubordination, L. dragged P. into the corridor, and found C. lying dead on the bed. The skull was battered open. The stump had recently been cleaned off with a rag. In a bucket were hidden blood-soiled bed-clothes. P., to all questions as to his motive for the killing, he replied at first with mere looks, utterly vacuous and demented. Subsequently he denied that he had killed any one, or that he had even seen a dead man. As to the blood which disfigured his hands and face, he said that his nose had bled during the night. The story of the bleeding nose and the unwillingness to talk were evidence that the boy had at least a partial conception of the enormity of his crime and of the expediency of feigning insanity. That he was insane and feigning insanity was clearly evident to even the newspaper reporters and to the jury who subsequently tried and found him insane.

Dr. J. H. McBride⁹ has recently reported the case of a paranoiac (primary monomaniac) who committed a murderous assault, on her trial pleaded insanity of an hallucinatory type, and suggested questions to her lawyers to put to the experts.

From these cases it is obvious that simulation does not show, as has been claimed by A. E. Macdonald, C. F. Macdonald, Allan Mc L. Hamilton, and as Legrand du Saulle seems inclined to claim, that the person feigning is sane.

From the errors shown to exist in Dr. Robertson's reasons, and from the error just alluded to, of Legrand du Saulle, it is clear that no case should be investigated from an *a priori* standpoint, but that each case should be investigated on its merits. The question should be not as much to determine if the prisoner be insane as to ascertain the psychosis from which he appears to be suffering. If his symptoms and history do not agree with such psychosis, it may be assumed that the individual examined is feigning. Neither premeditation nor business ability, nor literary skill, nor the power of logical analysis, constitute evidence of sanity. Each of these might be the clearest evidence that a certain psychosis did not exist, while at the same time such powers would be perfectly compatible with other psychoses. In dealing with the question of alleged insanity, the expert should say to himself: "The person examined tries to convey the idea that he is suffering from a particular form of insanity. That type of insanity does not present such symptoms, and the insanity is, therefore, feigned, and there is no evidence showing that any other type of insanity exists." The reasons for exclusion of the different types should be given at length; there would not then be so much seeming disagreement. Unless an expert clearly defines his position, the leading ideas of that position only are grasped by the lawyer, and these are placed in seeming contradiction to the opinions of authorities with which they would not, even in appearance, conflict were they clear outlined.

* *Annales. Medico-Psych.*, July, 1883.

1. *American Journal of Insanity*, October, 1874.
2. *Alienist and Neurologist*, July, 1883.
3. JOURNAL OF NERVOUS AND MENTAL DISEASE, April, 1882.
4. *Alienist and Neurologist*, July, 1883.
5. *American Journal of Neurology and Psychiatry*, 1882.
6. *L'Encéphale*, No. 1, 1882.
7. "Insanity : Its Classification, Diagnosis, and Treatment."
8. *American Journal of Neurology and Psychiatry*, August, 1883.
9. *Alienist and Neurologist*, October, 1883.

THE NEUROTIC DISTURBANCES AFTER JOINT AFFECTIONS.*

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I N the same manner as in late years the subject of joint affections occurring during the course of, and directly dependant upon certain diseases of the nervous system, was met with considerable attention on the part of neurologists as well as of surgeons, so also has the *circulus vitiosus* been completed and an amount of attention paid to nervous changes occurring consecutively to various joint affections, which upon first thought seems to be entirely disproportionate to the importance of the subject under consideration. It is to this latter class of cases that I desire to attract your attention this evening, and if I succeed in substantiating their gravity if left to themselves, and the great benefit which may be derived from a judicious course of treatment, we will have devoted our time to some purpose. When we consider how frequently joint lesions, both traumatic and idiopathic are encountered, and what proportion of them are followed by some disorder of the nervous elements surrounding the joint, we are enabled to realize the importance of this subject. It is, however, a noticeable fact that, notwithstanding the frequent occurrence of these troubles, it is only of late years that the subject has received any

* Read before the New York Neurological Society, Dec. 4, 1883.

particular notice or attention. This apparent neglect was probably due to the reason that the casual relationship between joint affections and consecutive atrophic paralysis was not properly understood. Many subjects whose history we trace in medicine or surgery may be found alluded to in some shape or other by the old masters, so also has the prognosis of the class of cases of which we are now writing, received mention by Hippocrates,¹ but from that period to the time of John Hunter no reference of any value can be found. Hunter, however, in his complete works devotes an entire chapter to the subject of paralysis consecutive to arthritis, at the same time it is necessary to note that his description of the affection and its course is incomplete and in many points inexact. He explains the causal relationship satisfactorily to himself upon the score of sympathy. That this explanation is unsatisfactory to us, need not be stated, but whether later authors are more satisfactory, when they call these affections reflex, than Hunter was when he described them as sympathetic, is questionable. From Hunter to Malgaigne,² 1836, we have another lapse of year which passed dormant on the subject. From Malgaigne until the last decennium the whole literature, which is scanty, is almost exclusively French. During the last ten years those who have done most towards the enlightenment of our views upon the subject have been Weir Mitchell³ by his studies upon the injuries to nerves, Duchenne (de Boulogne),⁴ Vernenil, Sir James Parget, and finally those investigations of Charcot and his pupils, which bear directly upon the question. At present there cannot be any doubt that this paralysis which affects certain muscles or groups of muscles predominantly, and is a complication or a sequel-

¹ Hippocrates : " Traduction de Littre," vi., p. 69.

² Malgaigne : " Mémoire à l' academie royale," 1836.

³ Weir Mitchell : " Injuries of nerves and their consequences." Phila., 1872.

⁴ Duchenne : " De l' Electriscuion Localisée." Paris, 1861.

lor, of the various spontaneous or traumatic lesions of the corresponding joint, is directly due to and dependant upon these affections. This has been conclusively demonstrated not only by clinical experience but also by the experiments of Valtat¹ in 1878, and later by those of Christin.² Valtat has shown experimentally upon guinea pigs and dogs, that as a result of an injury to the articular, or even to the periarticular tissues, produced by irritant injections, the muscles of the entire limb, but more particularly the extensors of the joint became affected, and that the atrophy which was simple in character, came on very quickly after the injury, being equal to twenty per cent. at the end of one week, and to forty-four per cent. at the end of two weeks.

These two theses of Valtat and Christin have not met with the recognition outside of France that they deserve, and the dissertation of Valtat, which is now five years old, is certainly very little known. For this reason I will cite the following experiment in detail. It is taken from Christin's dissertation, and is exactly like the experiments performed by Valtat :

EXPERIMENT.—April 18, 1880.—A dog of the age of one month. Injection, by means of a hypodermic syringe, of three drops of oil of mustard into the right knee-joint. Rapid enlargement ; severe pains upon pressure. The animal immediately flexes its leg under the abdomen. 19th. The swelling of the knee-joint has produced an œdema of the lower part of the right thigh. The animal remains almost continually in the recumbent position. 22d. The right knee remains swelled, and limping is uninterrupted. Atrophy of the affected limb becomes noticeable. 27th. The knee has decreased somewhat in size, and the limping takes place only occasionally. 31st. The animal is killed ; the two limbs are severed from the body. The subcutaneous areolar tissue is almost entirely absent. The right knee is swollen, the periarticular tissues thickened and œdematous. The synovial membrane is of a deep red color ; the joint surfaces themselves have retained their nor-

¹ Valtat : Thèse, Paris, 1878.

² Christin : Thèse, Paris, 1880.

mal appearance ; the muscles of the right thigh are atrophied and paler than those of the healthy side. The muscles of the leg are not as much affected as those of the thigh, but they are paler and thinner than when in normal state. The various parts of the two extremities were then weighed and compared with each other, and the following results obtained :

	LEFT. WEIGHED	RIGHT. WEIGHED
Extremities	420.00 grammes.	340.
The sartorius muscle	4.00 "	2.5
The biceps, semi-tenchinosus, and semi-membraneous	65.00 "	48.00
The adductors and vastus internus	94.00 "	73.00
The triceps, græilis, and tensor fasciæ	88.00 "	63.00
Gluteal muscles	34.00 "	23.00
Gastrocnemei	25.00 "	21.5
The remaining muscles	28.00 "	24.00
The bones not scraped	83.00 "	86.00

These various muscular masses were then, after having been weighed, placed into two jars filled with ether, which was frequently changed. About a month after the death of the animal the muscles were again weighed. After remarking that the fat was almost entirely absent, it was also noted that the difference in weight between the different parts, which now consisted almost solely of muscular fibres, remained about the same.

The affections which most frequently follow affections to joints are paralysis and atrophy of the muscles, and hyperplasia of the subcutaneous connective tissue. These disorders being the most common and the most frequently encountered, have naturally met with the greatest attention. Besides these, there is another class of disorders which, although not as frequent as the paralysis and atrophy, are, nevertheless, of sufficiently frequent occurrence, either alone or as a complication, to merit being withdrawn from the neglect which has hitherto been their lot. This class embraces anæsthesia, hyperæsthesia, analgesia, hyperalgesia, also sclerosis of the skin, and neuralgias. The latter especially may become very troublesome.

The symptoms and course of the affection will be best shown by means of the cases which are detailed below, but

there are a few remarks which it would be well to make now, and which may serve to elucidate the symptomatology. The nervous changes which take place after joint affections implicate three groups of nerve functions,—motility, sensation, and nutrition. The course of the affection is more or less as follows: After some lesion to a joint, slight or severe, at a variable period of time, the first thing that attracts the attention is a gradual change in the appearance of the limb. This, which prior to the injury, was firm and well rounded with the muscular eminences well marked, becomes soft and impressionable to the touch. The muscles become flattened, gradually lose their distinct outline, and finally the contour of the limb being effaced, it presents the appearance of one even mass, without any muscular eminences or depressions.

At the commencement, and sometimes even prior to the disappearance of the joint affection, the extensor muscles seem to be the ones which are most involved, but if the joint affection is of long duration, the other muscles become implicated in their turn, first and foremost, however, those muscles which surround the joint. Besides this general change which takes place in the appearance and consistency of the muscles, their contractile power is also diminished and, finally lost. This again is particularly the case with the extensors, although the other muscles are not entirely exempt. The electro-muscular excitability is occasionally unaffected, but in the great majority of cases it is decidedly lowered, both to the action of the faradic as well as to that of the galvanic current. By that I desire to express, that a much stronger current is requisite to produce contractions upon the affected limb than upon the unaffected, and indeed in some cases, where the affection has progressed very far, it is possible to obtain contractions with the strongest current only. Seeing this lowered excitability to the faradic

current, we would be led to expect an increased reaction to the galvanic. This is, however, not the case. We do not find any reaction of nerve degeneration, no reversion of the normal contraction formula, but simply a lowered contractility.

Rumpf has, at the clinic of Erb, paid particular attention to the electrical reaction of the muscles in these nervous sequellæ of joint affections, involving in his cases mostly the shoulder and the knee, and his results are, as I have formulated them above, that there is a simple diminution of electrical excitability, and never any qualitative change. This, which has repeatedly been corroborated by Erb himself, constitutes a distinctive point between these muscular changes and any degenerative atrophy.

The time of appearance of this paralysis has been put down differently by various writers. Valtat, in a case of traumatic hydrarthrosis, which he reports in his thesis, has been able to detect it as early as twenty-four hours after the accident. I myself have never been able to notice any paralysis prior to the third day. One thing, however, is certain, and that is that in many cases it appears much earlier than we have been in the habit of supposing. The neurologist rarely sees these cases during the progress of the arthritis; they are brought to him only after the paralysis is fully developed, and thus he is unable to decide at what period it actually supervened.

I expected to find elucidation upon this point in surgical reports, but have been disappointed. On the other hand, there is another class of cases where this disorder occurs very tardily. As for instance in the case which I mention below, in which the arthritis existed four months prior to the appearance of any nervous symptoms. As a rule the paralysis is followed by atrophy of the affected muscles. I say as a rule, for some writers—Descosse, Christin, and

others—claim to have seen cases of paralysis without atrophy. The cases which have come under my observation in which there did not appear to be any atrophy, were cases in which the intermuscular connective tissue and the subcutaneous areolar tissue were evidently hypertrophied, and thus obscured the atrophy which to my mind was present. This hypertrophy of the subcutaneous areolar tissue occurs in a great number of cases. The mere knowledge of its occurrence is sufficient to prevent its being mistaken for œdema.

It has impressed itself upon my mind that this hypertrophy of tissue stands in a direct ratio to the atrophy, particularly in those cases of periarthrititis of the shoulder-joint, and that the greater the atrophy of the muscular substance the greater was the hypertrophy of the subcutaneous tissue. On this account many cases in which there was decided atrophy did, upon inspection, not appear to be atrophied at all. This atrophy is ascending and progressive in its course, and if not treated and its progress arrested, may, as in a case reported by Dr Révellont,¹ involve the entire half of the body. The atrophy follows the paralysis very rapidly, never, however, does it precede it. The atrophy can generally be made out by means of comparison by the eye or by the centimètre measure, which will be found sufficiently accurate for all practical purposes. Contracture of the muscles is also spoken of as forming a prominent complication; following the paralysis and atrophy at a short interval of time. Of the thirty cases which have come under my care since the first of January, 1883, and of which I have notes, none were associated with contracture. Of cases seen previous to that date I have no notes, but cannot recall its presence. At any rate I can safely say that, never having seen it myself, it is not of frequent occurrence. The disor-

¹ Révellont : *Gazette des Hospitaux*. 3 août, 1878.

ders of sensation which are met with, either in conjunction with the disorders of motion, or alone, are hyperæsthesia and hyperalgesia, anæsthesia and analgesia ; also neuralgias. I find that these disorders of sensation, especially the hyperæsthesia and hyperalgesia, are early symptoms, sometimes lasting only for a very short period of time. Anæsthesia and analgesia, on the other hand, may be met with at any stage of the affection, and they frequently last for a long time and are very tenacious. They are naturally easily overlooked unless specially sought for.

The neuralgia, which is met with in certain cases, and which is mentioned as occurring in three of Descosse's cases, in all of which it affected the crural, is peculiar in some of its characteristics. The pain is not a sharp lancinating one, but is dull and not easily excited by pressure. Still, the points of Valleix are easily made out. The patients complain of spontaneous pain along the course of the nerves, even without having had their attention directed to it.

There is hardly any necessity for dwelling upon the differential diagnosis between this affection and other atrophic paralyses. Once that the occurrence of such disorders after joint affections is impressed upon the mind the diagnosis becomes a question of observation and nothing more. There is, however, one disease which under certain circumstances may be confounded with it at the commencement, and that is progressive muscular atrophy. I mention this because the prognosis in the two diseases is so much at variance that we cannot be sufficiently guarded not to fall into so serious an error. Furthermore, I am convinced that many cases which have been reported as cured cases of progressive muscular atrophy were simply cases of atrophy after joint affections.

Atrophy, following affections of any of the joints of the hand, may in the commencement present no dis-

tinctive symptoms from those of progressive muscular atrophy. We, however, owe to Erb the discovery and description of degenerative reaction in the atrophied muscles of progressive muscular atrophy, which although very difficult to demonstrate clearly, is present in all cases, and it is this which constitutes the distinctive point for differential diagnosis. Erb ¹ found this degenerative reaction to be present in all undoubted typical cases of progressive muscular atrophy, and Vierordt ² has recently published a series of cases which corroborate this. Furthermore, in progressive muscular atrophy the atrophy always precedes the paresis. In the cases which are now being considered the paralysis, in my experience, always precedes the atrophy. Another point which may be serviceable is, that in the majority of these cases we also have disorders of sensation in conjunction with the disorders of motion. Sometimes a hyper-æsthesia, sometimes an anæsthesia; and even if at the time of examination we are not able to detect them, we will upon inquiry in all probability obtain a history of their previous existence. These symptoms may also occur in progressive muscular atrophy, but they are much less frequent, less marked, and always appear late in the disease. Even with these points to aid us, if in a case we are unable to detect any change of degeneration, have no clue as to the time of onset of the paralysis, and cannot find any distinct changes of sensation, we are obliged to leave the diagnosis *in suspensu*, and to allow Time, the best differential diagnostician in this case to help us out of our quandary.

During the last year I have collected and made notes of thirty cases of nervous disorders following joint affections. I have probably seen many more but have neglected

¹Erb: "Handbuch der Electrotherapie," p. 201.

²Vierordt: "Über atrophische Lahmungen der oberen Extrem," *D. Archiv. f. klin. med.*, 1882, Bd., xxxi, p. 506.

to make notes of them. These notes when analyzed show that

The knee-joint was affected in	4 cases.
“ wrist- “ “ “ “	4 “
“ elbow- “ “ “ “	3 “
“ finger-joints were “ “	3 “
“ shoulder-joint was “ “	10 “
“ ankle-joint “ “ “	2 “
“ hip-joint “ “ “	4 “

The conclusions which I am justified in drawing from the notes of these 30 cases, are :

1st. That in all cases, except those involving the ankle- or wrist-joint, the muscles affected were the extensors of the diseased articulations.

2d. That in those cases involving the ankle or wrist, the affection was descending instead of ascending in its course, and that the extensors were not affected to any greater extent than the other muscles.

3d. That in cases of arthritis of any of the joints of the fingers, the interosse muscles suffered first and most.

The cases which merit a more detailed description and which present particular points of interest are the following :

CASE 1.—Mrs. F., æt. 24. While out walking last winter she slipped, and falling, struck her right knee with considerable force. The joint rapidly increased in size and was very painful to the touch. When I examined her upon the day following the accident the knee was very much swelled, the patella pushed prominently forward, and a distinct feeling of fluctuation was obtainable. Passive and active motion was very difficult and painful. The joint affection improved rapidly ; but upon the seventh day a distinct paralysis was noticeable, and whereas the movement of flexion of the leg upon the thigh was easily executed, that of extension was connected with great difficulty. The patient could only by the strongest effort of the will produce any contraction of the triceps cruris. Atrophy could, at that time, not be made out. After a lapse of two more weeks—three weeks from the time of the injury—no difference in the appearance of the affected joint

itself from that of the healthy one was observable. As the effusion became absorbed, however, the paralysis increased, and it was then an impossibility for the patient, the leg having been flexed upon the thigh, to extend the same. The affected muscle remained perfectly flaccid and presented a striking contrast to the triceps of the other thigh. At this time atrophy of the muscle was well marked, showing a difference of three centimètres in favor of the healthy limb. The gluteal muscles also were somewhat involved, for upon inspection a flattening of these muscles was noticeable. The electro-contractility of the muscles was decreased to the action of both currents. There was, however, no degeneration reaction, and the contractions obtained were in their normal relationship. It required a considerable stronger current to produce contractions upon the affected muscles than upon the unaffected.

The patient was discharged cured at the end of three months. Of the treatment I shall speak later.

CASE 2.—The following case illustrates how early after the injury paralysis and atrophy may ensue. The period between the occurrence of the injury and the onset of the paralysis is, in this case, the shortest that I have ever observed.

Patient. A laborer, thirty-four years of age, was struck upon the left knee by a falling piece of timber on a Friday afternoon. He went home, and under the counsel of a physician, applied ice to the joint. The swelling, which could not have been very great, went down, and when I saw him upon the following Monday, seventy-two hours after the injury, a distinct paralysis of the triceps was noticeable, and atrophy was distinguishable upon the following Friday. Both the paralysis as well as the atrophy may have been present before the days upon which I detected them, as I saw the patient for the first time upon the day on which I noticed the paralysis, and then did not see him again until the day upon which I made out the atrophy.

CASE 3.—The following case illustrates very well how entirely disproportionate the effect may be to the cause. It is indeed astonishing to find a periarthrititis, which is almost *nil*, produce an almost entirely useless limb. In the majority of cases, it is true, the joint affection, whether

it be spontaneous or traumatic in its origin, which causes the subsequent paralysis, is a painful one, and one of great severity; but there are frequent exceptions to this, and a simple sprain may produce a paralysis which is very far-reaching in its effect. This fact has induced Charcot to utter the formula: "The paralysis and atrophy following joint affections stand in no ratio whatever to the primary lesion."

Patient, L. H., æt. 30, merchant. While walking, his left ankle-joint turned so that the outer margin of the foot rested upon the ground. The pain was very severe, but he did not fall. He was, however, obliged to sit down and rest for a short time. He then continued his walk and used the joint for several hours, and then, because it felt hot and heavy, he went home and took off his shoe. Did not notice any change in the appearance of the joint, but says it was painful upon pressure. During two months his ankle seemed somewhat tender, and he would have an occasional darting pain in the foot and up the leg. Did not give up his occupation. At the end of two months he noticed a slight weakness in the injured leg. This was particularly observable on going down stairs. He then consulted various physicians, but did not place himself under any systematic course of treatment. After another lapse of two months—four months after the accident—he came under my observation. His condition was then as follows: His foot, which hangs with the toes pointing downward, cannot by any effort of the will be brought to a right-angle with the leg. When he walks—and this is a great effort for him—he does so upon his toes, and does not bring his heel to the ground. The toes may be easily raised, but they fall back again by their own weight. The interossei of the foot are atrophied, the peroneal muscles to a very great extent; and the muscles of the thigh are also involved. The gluteus maximus is evidently considerably atrophied, for a large depression takes the place of its former prominence. Added to this, severe neuralgia of the peroneal and sciatic nerves rendered his condition almost unendurable.

It is hardly necessary to cite any more cases illustrative of the various symptoms which occur during the progress of this disorder: the above three cases, together with the

symptomatology, are amply sufficient ; but before speaking of the pathogenesis and treatment, I desire to mention a class of cases which have been described as periarthritides. The majority of my cases in which the shoulder-joint was affected come under this category. Putnam has lately, in the *Boston Medical and Surgical Journal*, written quite an extensive article descriptive of this class. The symptoms are similar to those which I have described above, but they vary in some particulars.

There is according to Putnam, and I can corroborate it,

(1) An inability to raise the arm above the horizontal plane of the shoulder.

(2) Spontaneous pain generally worse at night, felt either in front of the joint and extending down into the biceps, or behind and remaining stationary.

(3) A slight degree of muscular atrophy of the deltoid and other muscles of the shoulder.

(4) Tenderness on pressure over certain points about the shoulder.

Duplay¹ and Desplats² show that pathologically this affection involves the subacromial bursa, and the loose bursoidal connective tissue beneath the deltoid muscle, and that adhesions are formed external to the joint, the surfaces of the joint itself remaining unaffected.

The pathogenesis of these nervous sequellæ of joint affections has long been a mooted question. Ever since Hunter advanced his theory, which as before remarked, explained these accidents, by a kind of sympathetic action, up to the latest theory, that of Charcot, the subject has been theorized upon and retheorized upon, until we to-day occupy almost the same position in regard to it as we did at the end of the last century. The writers who succeeded Hunter, in describing the paralysis consecutive to dislocations of the

¹ Duplay : *Archives Gén. de Méd.*, 1872.

² Desplats : *Gazette Hebdomadaire*, 1878.

humerus, ascribed its causation to a nerve injury produced by pressure of the head of the humerus. Once that pressure was suggested as a cause, it was taken up and dilated upon ad nauseam, and pressure in its various forms became a veritable scapegoat. Roux (*Annales de Chirurgie*, 1845,) claimed that the effusion into the joint produced the pressure which caused the paralysis. After this the pressure of the apparatus applied during the treatment of the joint affection was looked upon as the producing cause. Gosselin,¹ was the first to take a decided stand against this indiscriminate pressure theory, and showed plainly by arguments which are now trite, that pressure had nothing to do with the causation of these affections. Then followed the theory of functional inertia. This starts from the principle that, the nutrition of an organ being controlled by the harmonious coöperation of all the functional and nutritive elements, if this harmony is destroyed by rest and inactivity of the affected limb, the nutrition of the muscles will necessarily suffer. This theory certainly does not accord with clinical facts, for cases are on record in which the muscles have been in absolute repose for a very long period of time, without any atrophy ensuing. Furthermore, I see no good reason, if this be true, why, in persons confined to their bed on account of some joint affection, the healthy limb is not also affected in its nutrition. It is possible that in some few cases, those for instance in which the atrophy comes on slowly and late, may be explained by this theory; but those cases, and they form by far the majority of all, where the atrophy ensues rapidly after the joint affection, can certainly not be satisfactorily thus explained.

Vulpian was the first, in 1875, to distinctly enumerate a purely nervous theory as an explanation for these occurrences. In his "*Leçons sur l'appareil vaso-moteur*," Paris,

¹ Gosselin : *Gazette Hebdomadaire*, 1859. Clinique Chirurgicale de l'hôpital de la Charité.

1875, vol. ii, in speaking of atrophy of the deltoid consecutive to arthritis of the shoulder-joint, he says: "In the majority of cases it must be classed among the *atrophies* called reflex; that is to say, among those which are a result of a change in such or such region of the gray matter of the spinal cord, produced by irritation of the peripheral ends of certain sensitive nerves."¹ This is the reflex theory in its entire simplicity. All writers who have written upon the subject since that time, with the exception of Charcot and Descosse, have adopted this theory and followed in Vulpian's footsteps.

Charcot, however, has so modified it that his theory is essentially a new one, and Descosse has entered upon an unbeaten path.

To these two last theories, which merit particular attention, I will now pass.

It is hardly necessary at present to show that the various component parts of a joint,—the ligaments, the synovial membrane, etc., in spite of appearing almost devoid of nerves,—have a very luxuriant supply. Sappey, in his *Anatomy*, speaking of the ligaments, says: "If I were to assert that they are as rich in nerves as the cutaneous covering, I would probably find myself accused of exaggeration, and, nevertheless, I would remain below the actual truth. The greater part of the ligaments is in reality richer in nerves than the skin of the trunk and of the limbs, but they have less than the skin of the fingers and toes." This supply of nerves to a joint being acknowledged, it is not difficult to admit that any inflammation which involves the joint itself may be propagated to the nerves of the joint and produce an irritation which will manifest itself by the hyperalgesia, hyperæsthesia, or neuralgia. The continuance of the cause

¹ Dans la plupart des cas, elle doit être rangée parmi les atrophies dites réflexes c'est à dire parmi celles qui sont la conséquence d'une modification provoquée dans telle ou telle région de la substance grise du centre nerveux cérébro-spinal, par l'irritation des extrémités périphériques de certains nerfs sensitifs.

would bring about more serious disorders, affecting the nutrition of the muscles to which the nerves are also distributed. Thus the termination of the nerve filaments distributed to a joint, participate in the general inflammation, and this is propagated from molecule to molecule, until the filaments become involved. This is the theory of Descosse, which, although not entirely satisfactory, is to my mind the simplest, and the one capable of explaining most of the symptoms.

An autopsy corroborating this theory, by showing that a neuritis is actually produced, and then by tracing the affected nerves from the joint to the paralyzed muscles, thus clearly showing the pathological connection, would be very valuable.

The only autopsy bearing upon this matter which I have been able to find, was performed by Débove, and described in the *Progress Medical*, 1880, p. 1011, upon a subject affected with chronic articular rheumatism accompanied by great atrophy of muscle. Unfortunately, this observation is entirely valueless for our purpose, as the condition of the nerve fibres in and around the joint was entirely disregarded, and the muscular tissue alone examined microscopically.

Charcot in a clinical lecture to his students, published in the *Progrès Medical*, 1882, p. 377, supports the following theory, and seems to consider it as the one which merits general acceptance. He says that the joint lesion, by means of the irritated articular nerves, has reacted upon the spinal centre and there modifies the centres, whence arise the motor nerves and those nerves which preside over the nutrition of the muscles.

He claims the existence in the cord of a more or less direct connection between the cells of origin of the articular nerves, and the cells of origin of the motor and trophic nerves

of the extensor muscles. When other muscles besides the extensor are affected, Charcot claims that the irritation which originated in the articular nerves has spread itself by diffusion to these other muscles. His conclusion is, that in these cases we have to deal with a spinal affection, which causes the atrophy and paralysis; and that this affection consists of a kind of inertia or stupor of the cellular substance.¹

The great variety of disorders which are encountered as sequellæ of joint affections, necessitates the command of a variety of means to combat them. The treatment naturally varies with the nature of the symptoms; and it would be utterly impossible to lay down a fixed plan of treatment as applicable to all cases. Still there are certain cardinal principles which must not be transgressed, and to those I will attract your attention. Of the treatment during the first stages of the disease, during the progress of the arthritis itself, I will say nothing, as it is not my province to discuss that, and the surgeons would probably consider it an infringement. The chief agents which we have at our disposal, in the treatment of these affections, are galvanism and faradism, massage, mechanical movements, nerve and muscle percussion, and hydrotherapy in the form of hot and cold douches. The indications for the usage of the different currents of electricity do not differ here from those which we lay down in other circumstances. There is one caution which I desire to express here, and that is, against the use of the faradic current while there are any neuralgic pains present, and I frequently interrupt the electrical treatment for a time, if these pains reappear after having been absent. In 1872, Prof. Lefort, of Paris, in a paper read before the Société de Chirurgie, recommends very highly continuous currents of low intensity and applied for a long period

¹ Une sorte d'inertie, de stupeur de l'élément cellulaire.

of time. He claims, in cases like those under consideration, to have achieved rapid and permanently satisfactory results. He allows the current to pass uninterruptedly for days at a time ; or, if the patient is not obliged to be confined to his bed, he applies the current at night only. This plan of treatment has found some adherents in France. Lefort himself admits having produced severe eschars in some instances, and for the avoidance of this, counsels interposing a wet sheet between the skin and the electrode. I have never tried this mode of treatment, and merely mention it here as an historical curiosity.

The agent, however, which in my hands has proven far more serviceable than either the galvanic or the faradic current, is massage. 'This, combined with mechanical movements, has aided me in effecting a cure in many cases in which, with electricity alone, I would have made a signal failure. Upon this question of massage, owing to its great importance in the therapeutics of this class of cases, I desire to make a few remarks. By massage I do not mean the general manipulation of the body known as hygienic massage, but local manipulation of the muscles. Massage, derived from the French verb *masser*,—to knead,—is really a misnomer, for the various methods of massage are numerous, and those of kneading is only one. Thus, in the treatment of the neuralgia which complicates the cases under consideration, no kneading is employed, but a rubbing or stroking; and in those cases of hypertrophy of tissue, or in those of periarticular adhesions, quite a different procedure is called into requisition. Nevertheless, this is all massage,—even the mechanical and systematic muscular exercises may be included under this name. The various effects which we can produce by massage are :

- (1) The diffusion of any articular effusion.
- (2) The comminution of vegetations.

- (3) The loosening and destruction of adhesions.
- (4) Increase of circulation.
- (5) Stimulation of muscular fibres.

The fact that exudations may be diffused by means of massage has been largely disputed, and does not meet with the recognition which it deserves.

The following experiment, by v. Mosengeil,¹ proves conclusively that these denials are unfounded. V. Mosengeil made a series of experiments, of which I will give one in detail.

For these experiments he made use of a fine emulsion of the best Indian ink.

EXPERIMENT.—On Jan. 27, at 9 A. M., a thick solution of finely pulverized black Indian ink was injected by means of a hypodermic syringe into both knee-joints of a vigorous female rabbit. Not quite an entire drop of fluid returned through the puncture. The temperature in the rectum was 100.8° F. immediately after the injection. At 9:30 the right knee was massaged. At 9:45 another syringeful of finely triturated ink was injected into each knee-joint, and the right knee massaged immediately after. Thereupon the swelling went down. The left knee which, for the sake of control, was not massaged, in consequence of the movements of the rabbit also grew gradually thinner. At three o'clock in the afternoon, another syringeful was injected into each joint and the right joint again massaged. After the lapse of two minutes all enlargement had again disappeared; the left joint did, this time, not decrease in size. The temperature had, up to that time, risen to 102.2° F., and, in the evening at 8:30, it rose to 104°. At 8:45 ink was again injected into each knee-joint, and the right one again massaged. The left joint this time did not retain an entire syringeful. On the morning of the 28th, half a syringeful of thick ink was injected into each elbow-joint of the animal, and the joints massaged immediately after. Thereupon the animal was killed and dissected. The condition was as follows: Ink was found in the periarticular connective tissue of the upper extremities, and around the punctures of the needles, permeating the subcutaneous parts, and distributed in irregular spots. The black coloring

¹ *Langenbeck's Archiv f. klin. Chirurgie*, 1876, 9 bd., 3 und 4 heft.

matter could be traced upward, following the course of the vessels and muscular interstices. The lymphatic glands of the axilla contained coloring matter upon the one side, and the minute afferent vessels were colored intensely black. In all the joints which had not been massaged, much more coloring matter was found than in those which had been so treated. It was thus shown that, in a few minutes after the massage, the particles of coloring matter, which had been injected into the joint, had been diffused and forced into the lymphatics.

One reason why the treatment by massage has met with so little support is the difficulty encountered in following the descriptions of European writers. They have divided the different methods into so many classes and varieties that it is impossible to bear them all in mind. The French writers especially have divided and subdivided, laying down a special indication for each subdivision until one is perfectly bewildered by the vast array of methods which are claimed to be essential to success.

Rossbach¹ makes a very simple division of massage into stroking, rubbing, kneading, and beating, at the same time severely criticising the inventors of the numerous subdivisions, he says: "As may be seen from the physiological part it is simply a question of the removal of blood, lymph, and exudations, from the periphery toward the centre. For this purpose therefore, stroking, rubbing, kneading, and beating, are sufficient to achieve every thing that can be achieved by this method, and therefore the urgent request might be addressed to those ingenious inventors of new diminutive subdivisions, please to keep their inventions to themselves."

The process which, in the treatment of these cases, has been of great service to me, particularly in those cases in which there is no hypertrophy of cellular tissue, is that known as muscle percussion or beating (*Tapotement*). For this purpose I have been in the habit of using the following

¹ "Lehrbuch der Physikalischen Heilmethoden," p. 492.

two instruments. It is well to mention here that this is the only form of massage which I consider can be as well performed by means of mechanical contrivances as by the hand; for all other modes the hand certainly merits the preference. The first was invented by C. Klemm, manager of a gymnasium in Riga, and consists simply of elastic rubber hollow rods attached to a handle. They are manufactured in three different sizes, ranging in length and thickness. The second, and I believe I am indebted to Dr. Hammond for this idea, is nothing more nor less than a baby's rattle, filled with cotton, and used as a hammer. Both of these instruments are only serviceable when the tissues to be acted upon are very superficial.

The majority of writers, during the early stages of these disorders, imperatively counsel rest. Once that the active inflammation has subsided, I am entirely opposed to this. I generally begin a course of passive motion at once, break up all periartritic adhesions mechanically, and if there is paralysis or atrophy, without any neuralgic pains, I make use of faradism combined with some form of massage. I consider mechanical movement passive,—and, if possible, also active,—a very important adjunct to the application of massage, for Ludwig has shown that the action of the muscles upon the fluids of the body is comparable to that of a pump. Therefore, admitting that the extraneous pathological product, which has been formed in and around the joints in consequence of the inflammation, has been loosened and triturated by means of the massage, and being then in a condition suitable for removal by the lymphatics, it is then compressed by means of the muscular action, which is produced either actively or passively, and forced into the efferent vessels. If, however, there is pain along the course of the nerves, I discontinue the electricity, and having satisfied myself that the pains are neuralgic, and not due to

a neuritis, I proceed with the massage alone. As far as the treatment of the paralysis and atrophy is concerned, I would be at a loss to state in which I have most confidence—electricity or massage; but it is certain that in many cases neither one nor the other will suffice, but that the two combined, together with mechanotherapy and hydrotherapy, are necessary to bring about satisfactory results. All these agents seem here to act similarly, by stimulating the nutrition of the affected muscles and surrounding parts, by increasing the flow of blood, and perhaps thus causing a reflex excitability of the motor tracts.

The prognosis of these cases under treatment is good, still, occasionally cases are encountered where the utmost patience and perseverance are essential to success, and for this class of cases I can give no better advice than is contained in the proverb, "*Gutta Cavet Lapidem.*"

INEBRIATE AUTOMATISM.

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IN 1879 I published a paper based on a clinical study of cases under my observation, in which it was shown that total blanks of memory and consciousness were not infrequent in inebriety, and that the inebriate in this condition went about as usual, giving little or no evidence of this state. He was literally an automaton, going about like a somnabulist, without conscious realization of events and surroundings.

This paper excited no attention, other than to bring out the records of many similar cases occurring under the observation of physicians and lawyers.

Through Dr. Motet of Paris I learned that this condition had been observed in alcoholic cases, but had never been the subject of special study before. This physician presented some medico-legal considerations of this subject at the International Congress of 1881, resulting in a very interesting discussion. In 1881, before the Medico-Legal Society, I gave the result of further studies and conclusions on this subject under the title of "The Trance State in Inebriety: Its Medico-Legal Relations." This was published with an introduction by the late Dr. Beard, and, with the paper of 1879, was without doubt the first medical study of the subject. This paper has received the usual

sneers and praise incident to every new phase of mental disease that is presented, and has most unexpectedly put into my hands the records of a large number of similar cases, which have come under the notice of physicians and been brought out in court. Most of these cases are not available for accurate study, as they merely point out some of the phenomena of this inebriate automatism, leaving all the other history a blank. From these and personal studies which I have made, the following facts may be stated as authoritative and correct :

1. That inebriate automatism is not an unusual phenomena in inebriety ; that it is noted by loss of consciousness memory of surroundings, and passing events, and the apparent full realization of a normal state, lasting from a few moments to several days.

2. This condition points to some profound disturbance of the higher brain centers, and of necessity is associated with impaired and lessened responsibility. Hence its practical importance in medico-legal circles.

3. In all cases it is found associated with a particular neurotic state induced or developed by alcohol, or existing before, and roused into activity by alcohol and other causes unknown. Inebriate automatism is distinct from a similar phenomena common to epilepsy and hysteria, and is without doubt a special and particular form of brain disease. Its pathology, as suggested by Dr. Beard, is most likely a cerebral exhaustion followed by a lowering of the consciousness below the plane of rememberability, or a suspension of nervous activity in certain directions, closely allied to paralysis of particular brain functions.

The whole subject is, of course, unknown beyond a few landmarks, and my purpose is to give some farther views of this mysterious phase of psychical and physiological disorder. All that can be done is to group and describe some

of the courser phenomena apparent in the automatic state, and give some examples which will afford glimpses of the wide unknown realms awaiting discovery.

The first general fact apparent from a grouping of the symptoms of inebriates in this automatic blank state, *is that a large number are found to follow an accustomed line of action. That is, during this automatic blank they act and talk in the usual manner, and do things which they are in the habit of doing day after day.*

Thus an inebriate farmer would, at certain times, have blanks of from one to four days, during which he would go on with his work as usual. He could never recall any circumstance or event connected with his work, any process of reasoning by which he changed from ploughing a field to drawing of the stones from it. An organist during the paroxysm of periodical drinking, would play an elaborate church service, and except a slight trembling and unsteadiness in the voluntaries, seem no different to his associates, and yet be totally oblivious of all the surroundings, and have not the slightest memory of it after. This man on one occasion while playing a funeral service called the leader, and declared that he would have to play "Yankee Doodle" unless some spirits were given him. A glass was procured and he went on steadily. He never knew or could remember this occasion. A travelling salesman, of years of experience and active work, would go over a route of customers extending over one hundred miles, and be gone three or four days, and never be able to tell or recall a single incident. The only history he had would be from his order-book and record of expenses. He would be drinking all the time, and yet seem fully conscious of every surrounding, acting in no way different, but memory made no record of passing events. In another instance an inebriate sea captain, who was always sober at

sea and drank hard on shore, would have an automatic blank lasting for one or two days at the point of sailing. He would recover consciousness a day after sailing and have no conception of any events at the time of going to sea. At this period he would show his usual judgment, attend to all the business, and appear sober and conscious of everything. To his associates he would use his note-book more freely, putting down every little event and fact, and not trusting to his memory. This blank would begin after a period of general drinking, and last one, two, or three days, or until he had stopped for twenty-four hours. Many of these cases, where the blank lasted any length of time, occurred in persons who were pursuing an exhaustive and monotonous work. *Another class of these inebriat-automatons are noted in which the line of conduct during this state was unusual and outside the ordinary events.*

Examples of this class may be mentioned. An inebriate farmer retiring and unambitious, suddenly entered upon a scheme of wild speculation, which he could not recall after. He bargained for a hotel, on one occasion, bought a share of a steamboat on another, and a race-horse on a third. To his friends he was unchanged except manifesting a great enthusiasm for wealth, which came on unexpectedly and disappeared in a mysterious way. He could not recall or remember a single event of these states. A banker who drank at long intervals at home, suddenly became a tract distributor in the lower part of the city, at a time when his services were demanded in his business. He would recover on the street and be confused to know how he came in that state; never having the slightest recollection of his condition. A lawyer, when drinking, will visit the theater or revival meetings, (if one be in the neighborhood) and be boisterous in his applause, or sympathy, never seeming intoxicated or oblivious to the proprieties of the time and

place, and yet he can not recall these events. I have noted a number of cases, where inebriates in this state joined societies or churches, and entered upon a course of conduct entirely foreign to all past experience. In some cases it was the outburst of some latent impulse or ambition, which had been smouldering in the brain,—in others it was traced to some thought that came from the surroundings, and in all instances the person was unable to explain it in any other terms except that he was “either drunk or crazy.”

Another group of this class are very prominent in courts, noted by the impulse from criminal acts, generally a low type, against both person and property. They act automatically and unconsciously, and this can be well attested in many instances, particularly where the acts were without motive or purpose, and foreign to all their previous conduct. Many of these cases commit assault, steal, forge names, and do various dishonest acts, of which they have not the slightest recollection, and the circumstances confirm this statement. They generally occur in chronic cases, who live in neglect of ordinary hygienic rules, and of course are more debilitated. Such cases come into court on grave charges, and although they protest ignorance are punished. The consciousness of innocence of motive, and injustice of punishment, precipitate them into a degree of recklessness that rapidly brings on a recurrence of this state. This was illustrated in a recent case of a man of standing who, in this automatic state, assaulted his wife. The knowledge of this plunged him into remorse and suicide. In another case a man in this state punished his child severely, and next day when he realized what he had done, drowned himself.

A large class seen in courts are congenital neurotic inebriates, and automatism in thought and action is common. Often in this state they develop impulses that have been under subjection before in their conscious moments.

Bad men discover this condition, and by causing the man to drink, may stimulate and direct this automatism to the perpetration of crime, which could not be accomplished otherwise. In many cases this is the fact, confirmed by the absence of efforts to conceal the crime or evert punishment, and unconsciousness of having done any thing wrong. The defense of no memory or recollection of the event is often a psychological fact. Strange and startling crimes committed by inebriates should always be the subject of careful inquiry, for, in many instances, this automatic state can be found.

Another group are noted, in which this automatic state precedes the period of excessive drinking. Like the aura preceding an attack of epilepsy, with this difference that the inebriate blank comes on early in the paroxysm of drink, and seems to be provoked by the moderate early use of spirits, then disappears, not returning again. They occur in periodical cases. An inebriate after a long period of abstinence, will suffer from some functional nerve trouble, be very irritable, and show great emotional disturbance. He may be suicidal, or almost delirious in his hope for the present and future. Then he will begin to drink and become slightly intoxicated, later he will fall into this trance state, and go about for an uncertain interval, then recover and enter upon a severe paroxysm, during which memory is clear, and consciousness of all passing events is undimmed, except when profoundly narcotized by alcohol.

Automatism comes on early and is very marked, and the patient is always active during this state ; chiefly in efforts to stop drinking. He will call on clergymen, for prayer, find temperance men, sign the pledge, and if he can get an opportunity to speak is often very eloquent ; when this passes off he enters freely upon a course of prolonged excess. He will have no memory of what he did after beginning to

drink for a few days or less time, then he will wake up with a feeling of abject despair and hopelessness, and give way to the drink impulse without restraint. A gentleman of wealth who is a periodical inebriate will begin at long intervals to drink wine. In a few days he will fall into a state of gloom and dread of death, make all arrangements for dying, and reason clearly, and be very sensible, then wake up, and be astonished at what he has done. After this he drinks freely but is always clear, and his memory is good of where he goes and what is done.

In a case under treatment those blank states were marked by kleptomaniac impulses which are without all ordinary reason or object, then they cease suddenly, and the most rigid honesty and respect for the rights of others follow.

In these groups, the inebriate is a mere automaton in motion, moving along certain fixed lines of action, or acting in obedience to some unknown forces, which not only develop new thoughts and deeds, but criminal impulses and acts foreign to all past conduct. He is at the mercy of unknown forces, which may change or vary any moment. Some governing center has suspended, and all consciousness of time and the relation of events has stopped.

Possible-changing thoughts and impulses, the influence of a disturbed organ, or the impression of a thought or desire coming from the past, may suddenly concentrate into action irrespective of consequences. Both subjective and objective states, influenced by conditions of health and brain power, may develop into deeds that are unknown and unrecorded by the higher brain centers.

This phenomena of automatism seems to have changed in many cases, becoming more prolonged and apparent as the inebriate becomes weaker. In one case under observation for four years, this blank state is now characterized by

great reticence and retirement, while formerly in this condition extreme activity was manifested.

In another case, sent to prison for life for manslaughter committed during this period, the blanks continued for many months at intervals, and then gradually died away. In two cases the patients recovered from inebriety, and the blanks disappeared.

Unfortunately, much of my clinical data give no information except on the conduct during this automatic state. No observations have been made on an earlier stage, and most of the cases sent to me are accounts of unusual acts, and the general proof that they were performed unconsciously.

In the study of cases under my personal care, the history of many short automatic periods appear, some of which clear up and are memorable after a time, but others are total eclipses. The conduct of many during this state is markedly insane, in others it is sane, and cannot be distinguished for any sign of failure.

Most of the cases I have published have been selected for their strong, startling features, and have been presented as types of a large class not so far on the road to extreme chronic states. I think that a large number of inebriates suffer from this blank automatism more or less, and as it rarely comes under medical observation, is more or less obscure. Intelligent inebriates conceal this state from their friends, from various motives, and unless some peculiar circumstances occur, it is unknown.

Recently a noted man disappeared, to the great distress of his friends, and he recovered consciousness three days out on an European steamer. He returned the next steamer, but could not account for or explain this action. He was a secret inebriate, and in an automatic state took passage for Europe.

When inebriety is fully studied from the standpoint of

science, this psychological phase of disease will be fully recognized, both in the court-room and at the bedside, and practical measures taken to remedy and prevent its recurrence.

ON THE STRUCTURAL CHANGES OBSERVED
IN THE ENDS OF THE TIBIAL NERVES FROM
THE STUMP OF AN AMPUTATED LEG.*

BY DR. H. D. SCHMIDT,

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MORE than eighteen years ago, in the autumn of 1865, I took the opportunity of dissecting the stump of an amputated arm, for the purpose of ascertaining the changes that had taken place, since the amputation of the limb, in the cut ends of the brachial artery and the median nerve. The examination resulted in finding both the vessel and the nerve embedded in and fused with an organized exudate, forming a part of the cicatrix of the stump. Though the ends of the vessel and nerve were adhering to this organized material, I succeeded in separating them from the latter, finding moreover, the vessel, which had considerably lost in diameter, still open and containing some blood, while the end of the nerve presented a bulbous swelling about twice the diameter of the nerve. No particular changes were observed upon the nerve-fibres by microscopical examination. They were easily traced into the bulbous swelling, where, however, their demonstration was attended with more difficulty, on account of the newly formed connective tissue, of which the swelling chiefly consisted.

Although I have, since the above examination was made,

* Read before the New Orleans Pathological Society.

met with a few other stumps of amputated limbs upon the autopsy-table of the Charity Hospital, I omitted, for the want of time or other reasons, to repeat this examination in a more thorough manner, until about three years ago another very favorable case presented itself to me in the body of a man, who had lost his left leg while serving as a soldier in the Confederate army during the American Civil War, and who had died in the Charity Hospital but a few hours before I dissected the stump of his leg. This limb had been amputated at least seventeen years before the patient's death, and the stump appeared to have been in a healthy condition—that is, well formed and cicatrized. After a careful exposure of the posterior and anterior tibial nerves, I found that both ended in comparatively large bulbous swellings (figs. 1 and 2), while they were not fused, or in any other way connected with the cicatrix of the stump, except by some very loose areolar connective tissue. On the contrary, the surface of the bulbous enlargement presented the same appearance as that of the nerve higher up, representing, therefore, the natural envelope of the nerve, the epineurium, formerly known as the neurilemma; the very ends of the bulbs only were slightly attached to the neighboring tissues. The consistency of these bulbous swellings was about the same as that of the nerve higher up.

Slight bulbous enlargements of the cut ends of nerves, such as I met with in the first case which I examined, have frequently been observed in the stumps of amputated limbs; and it is even believed that in every case of amputation these nervous ends become slightly enlarged by the inflammatory process, accompanying the healing of the stump. In a number of cases even, the enlargement of the ends of the nerves met with has been more considerable, resembling in extent the case before us. As some authors

had regarded these swellings as true neuroma I was glad to meet with the opportunity of enquiring, myself, into their true nature, and, therefore, looked with interest to the facts which my own studies should reveal.

After the removal of the lower portions of the tibial nerves, with their bulbous ends, from the stump they were divided into four pieces, two of which were hardened in Mueller's fluid, while the others were put into a weak solution of osmic acid ; and, when the material had obtained the proper consistency, thin, microscopical sections were made from different points of the specimens, to be mounted, either unstained or stained, in glycerine, or in Canada balsam. The results obtained from the microscopical study of these sections, as well as from teased preparations, will form the subject of this paper.

Before, however, commencing to describe the structural changes which I observed to have taken place in the bulbous ends of the nerves in question, I prefer, in order to facilitate the demonstration and discussion of the subject, to briefly review the manner in which the nerve-fibres are arranged and held together in a so-called compound nerve, which is composed of a smaller or larger number of nervous fasciculi, and, also, the relationship of the component elements of the whole nerve. All the larger nerves, such as the tibial nerves under discussion, belong to this order, being composed, according to their thickness, of a smaller or larger number of fasciculi, or bundles of nerve-fibres. In examining these fasciculi in a thin, transverse section of nerve, a smaller portion of which is represented in fig. 3, it will be found that, besides considerably differing in diameter, each of them is subdivided into still smaller bundles of nerve-fibres by a system of connective tissue septa, which, in the drawing appear as delicate fissures throughout the sections of the fasciculi. But during their course in the

nerve from the nervous centre to the periphery, these fasciculi give rise to branches which reciprocally pass from one fasciculus to another. A constant interchange of bundles of nerve-fibres is thus established between the component fasciculi of the nerve, resulting in the formation of a continuous plexus throughout the entire course of the latter. I have purposely dwelt upon this plexiform arrangement of the component fasciculi of the nerve, as it will assist in explaining the formation of the bulbous swelling of the ends of the tibial nerves above mentioned.

The fasciculi with their communicating branches,—which, in a transverse section of a nerve are represented by those fasciculi presenting a smaller diameter,—are surrounded by a distinct, well-defined sheath, the *perineurium* (fig. 3, *a*), which, according to the respective size of the fasciculus, consists of a smaller or larger number of delicate layers, or lamellæ, of connective tissue, mingled with elastic fibres. It is this peculiar arrangement of the perineurium which induced Ranvier to call it the “lamellar sheath” (*gaine lamelleuse*). These lamellæ, however, are not strictly concentrically placed around the fasciculus, but communicate with one another by others more narrow; though, from the changes which I observed the lamellar sheath to undergo in the bulbous swelling of the posterior tibial nerves, it appears to me more probable that the lamellæ themselves run into one another, instead of being connected by smaller bands, as it is stated. Both the outer and inner surface of the lamellæ are covered with a delicate layer of endothelial cells.

From the inner surface of the lamellar sheath another system of delicate layers of connective tissue arises, which, in the form of septa, not only divide the nerve-fibres of the fasciculus into smaller, or primary bundles, but, moreover, pass between the individual nerve-fibres themselves (fig.

3, *b.*). Around the latter the fibrils of the connective tissue run parallel with their axis, forming the so-called "fibrillar sheath" of the nerve-fibre, which on its inner and outer surface is said to be also covered by endothelial cells; it, of course, is connected with the foregoing septa. The connective tissue forming the septa and the fibrillar sheath is called the *endoneurium* (Key and Retzius), or, as Ranvier has termed it, the "intrafascicular tissue" (*tissue intrafasciculaire*). As this intrafascicular tissue is continuous with the connective tissue layers of the lamellar sheath, the spaces, left between the endothelial linings must also communicate with one another; that such a communication really exists has been demonstrated by the injection of colored materials into these spaces. They have, therefore, justly been regarded as lymph-spaces, representing the lymphatic apparatus of the nerve.

The nervous fasciculi, forming the larger nerves, finally, are bound together by membranous layers of connective tissue, loosely arranged and intermixed with fibres of elastic tissue. To this part of the connective tissue of the nerve (fig. 3, *c.*), the term *epineurium* (Key and Retzius) has been applied of late years. Ranvier calls it the "perifascicular tissue" (*tissue perifasciculaire*). It is slightly adherent to, and consequently connected with the perineurium, and not only binds the component fasciculi of the nerve together; but, also, fills up the spaces left between their communicating branches; it moreover gives support to the larger blood vessels of the nerve (fig. 3, *d.*).

In casting a final glance over the connective tissue elements of the nerve; we find that they are continuous throughout the different nervous elements just described, and that, in reality, they form but a single framework for the support of the nerve-fibres and blood vessels. The surfaces of this framework are, like the connective tissue

bundles elsewhere, imperfectly covered by endothelial cells.

Having thus far recalled to the memory of the reader the manner in which the nerve is built up by its component elements, I shall now enter upon the description of the pathological changes which I observed on these elements in the bulbous ends of the tibial nerves from the stump of the amputated leg, represented in their natural size by figs. 1 and 2. Before, however, passing to the consideration of the minute histological changes, let us first enquire into the manner in which the cut ends of the nerves were most probably so much enlarged.

Although it may be reasonable to presume, at first sight, that the enormous enlargement of the cut ends of the nerves, which we witness in this case, could only be caused by an increase of some of the histological elements of the nerves, this is but true to a certain extent. But even if the enlargement depended upon this cause, the disproportion existing between the bulbous swelling and the natural diameter of the nerve would hardly have been as great as it is, nor would its form have been so regular and so nicely rounded as we find it. We must, therefore, look for another cause. This may be found in the plexiform arrangement of the component fasciculi of the nerve above referred to, and, moreover, in the presence of elastic-tissue fibres in the lamellar sheath itself, and in the perifascicular connective tissue. These elastic fibres, in truth, may represent the chief factor in the formation of the bulbous enlargement, though the hyperplasia of the connective tissue, particularly of the endo- and epi-neurium, the latter filling up and enlarging laterally the interspaces of the plexiform fasciculi, may also play a considerable part in the formation of the bulbous swellings in question. That such a displacement of the fasciculi really takes place during the formation of the bulbs, may be distinctly seen by examining fig. 4, which

represents a longitudinal section of the smaller bulbous enlargement, that of the anterior tibial nerve, stained with picro-carmin, and magnified about four and a half diameters. In this drawing we observe the fasciculi—enlarged by the hyperplastic connective tissue, not only of the epineurium but also by that of the endoneurium—diverging after entering the bulb to converge again at its rounded end. Not only this, but, by examining the drawing a little closer, it will be found that the fasciculi, besides diverging and converging, form, within the bulbous swelling, numerous curves in different directions. In the centre, even, they are more crowded and curved than at the extremity of the bulb. In the latter locality, on the contrary, they will, to a certain extent, be found missing, the bulb consisting here only of loose connective, and of some adipose tissue. The darker spots, scattered throughout the drawing, represent the transverse section of fasciculi running at right angles with the axis of the bulb.

As regards, now, the free ends of the nervous fasciculi, produced by the section of the nerves during the operation, it will be difficult to decide whether they have remained free, or whether they may not have united to one another, forming loops throughout the bulbous swellings. For, as in transverse, as well as in longitudinal thin microscopic sections, fasciculi, cut transversely or in different degrees obliquely, or running even longitudinally throughout the section, are met with, no definite conclusion can be drawn from the examination. Nevertheless, if I may judge from a number of fasciculi which, in longitudinal sections of the bulbous swelling of the posterior tibial artery, I have traced from one side of the bulb around its rounded extremity to the other, I am inclined to the view that their cut ends have become united to one another to form loops around the lower portion of the bulb. The arrangement of the fasciculi, as seen in fig. 4, also points to this view.

Let us now pass to the study of the more minute histological changes observed in the anatomical elements of our subject, and commence with the examination of a transverse section of the posterior tibial nerve, taken from about one inch above the bulbous enlargement. In this section some changes were already observed to have taken place, consisting in an increase of the connective tissue of the endoneurium throughout the whole fasciculus. Thus the septa between the primary fasciculi, or nerve-bundles, were rendered thicker, and the spaces which they occupy appeared, in consequence, very distinct under the microscope. That layer of endoneurium, arising from and being in contact with the inner layer of the perineurium, as well as the larger septa, occupying the larger fissures seen in the section, particularly, had been considerably thickened. Not only this, but the so-called fibrillar sheath was here and there observed enlarged around some nerve-fibres, giving rise to a subdivision of the primary nerve-bundles. In a thin section of the same nerve, taken from just above the bulbous swelling, the same changes were observed in a somewhat higher degree. Besides, the fibrillar sheath around a greater number of nerve-fibres had now increased in thickness; though the thickening did not always extend around the whole nerve-fibre, but more in one or the other direction. The different parts of the connective tissue of the nerve, however, had still preserved their individual typical forms and relative distribution throughout its section. The perineurium, with its component layers, or membranes, closely applied to one another, therefore, was still observed to surround the fasciculus in the form of a distinct ring.

A totally different view I obtained in examining a thin transverse section, taken from the middle of the bulbous enlargement of the posterior tibial nerve, a small portion of which, enlarged about twenty-five diameters, will be

found represented in fig. 5. The first abnormality striking my eye was a complete disarrangement of the fasciculi and their lamellar sheaths; for, instead of the regular, round, or oval sections of the larger or smaller fasciculi, I now observed a great number of islands (fig. 5, *a*), very irregular in form and size, and surrounded by strata of connective tissue, distributed throughout the section. In a few places only, traces of the original fasciculi (fig. 5, *d*) were still met with, which, however, had also undergone considerable changes. The connective-tissue layers of the endo-, peri-, and epi-neurium, in fact, had become fused—or, in other words, had been converted one into the other; for all the connective tissue of the nerve showed the same character throughout the section. In some places small bundles of nerve-fibres were met with enclosed within some strata of connective tissue, resembling the remains of a lamellar sheath and presenting the appearance of having newly arisen there (fig. 5, *e*). As it can hardly be supposed that bundles of nerve-fibres would be newly formed between the membranous layers of the perineurium, this phenomenon somewhat perplexed me when I first beheld it, though I soon found an explanation for it, which will be stated in its proper place. Besides the fasciculi, presenting their transverse sections in the drawing (fig. 5) before us, there are others observed, cut obliquely, or running longitudinally in the plane of the transverse section of the bulbous swelling (fig. 6, *b*). How these obliquely and longitudinally running bundles of nerve-fibres got into the plane of a transverse section of the bulbous swelling, is easily explained by reflecting upon the course of the fasciculi in the latter, as above stated, and illustrated by fig. 4.

Before, however, proceeding still further with the consideration of the minute changes which I observed in the nervous and connective-tissue elements of the bulbous en-

largement, I must beg leave to diverge for a moment from the subject, in order to pass a few remarks on the probable cause of the hyperplastic process of the connective tissue, observed in this part of the tibial nerves.

I have already stated above, that in the sections of the posterior tibial nerve, taken from just above the bulbous swelling, the first pathological changes appear to take place in the connective tissue of the endoneurium. They consist in a thickening of those layers which arise from the inner strata of the perineurium, thence extending into the larger fissures of the fasciculus, to give finally rise to the septa which divide the latter into primary fasciculi, or bundles of nerve-fibres; at the same time, a hyperplasia of the fibrillar sheath, in one or the other direction of a number of nerve-fibres was already observed. Now, the more we approach the middle of the bulbous swelling, the greater we find the hyperplasia of the connective tissue of the septa of the endoneurium, which here is not only widening the spaces between the primary fasciculi, but, moreover, by extending into the latter, gives rise to new septa, dividing these primary bundles of nerve-fibres into still smaller ones. In some places, these newly-formed septa are observed to penetrate between the individual nerve-fibres, forming bundles or groups of three or four fibres, or isolating even a single nerve-fibre. While, however, the connective tissue of the septa thus proliferates into the primary bundles of nerve-fibres, that of the fibrillar sheaths, surrounding the individual nerve-fibres, also very considerably increases in quantity, contributing thus its full share to the formation of the bulbous enlargement of the cut end of the nerve. The same hyperplastic changes taking place in the connective tissue of the endoneurium, as just described, are also observed to occur at the same time in the epineurium throughout the whole thickness of the nerve, giving rise to the

formation of new connective-tissue layers, increasing still more the size of the bulbous ends of the latter.

The foregoing remarks on the probable course of the hyperplastic process in the connective tissues of the nerves relate only to two of the parts, or envelopes, formed by these tissues, viz.: The endo- and epi-neurium. Of the third part, the perineurium, which forms a special envelope around the nervous fasciculus, I have already stated that but a few traces are met with in the section taken from the middle of the bulbous enlargement. The question, therefore, arises, what has become of these lamellar sheaths, which, in the normal nerve, are so well developed and defined. In order to properly understand the disarrangement of the membranous layers of the perineurium and their fusion with the neighboring hyperplastic connective tissue of the endo- and epi-neurium, we must call to our mind that these layers are not strictly concentrically arranged around the fasciculus of nerve-fibres, but that they rather pass one into the other. In other words, each layer does not form a complete tube around the fasciculus, but only a portion of it. The free margins of this portion of tube are connected, not to the margin of the neighboring lamella, but to their surface; one lamella, therefore, runs into its neighbor, the whole forming a single framework around the fasciculus. While, however, those lamellæ forming the central part, or main bulk of the perineurium, are in this manner connected with one another, the free margins of the lamellæ, placed on the inner and outer surfaces of this envelope of the fasciculus, are continuous with the connective tissue lamellæ of the endo- and epi-neurium. It is in virtue of this relationship, existing between these connective-tissue envelopes of the nerve, that two of them, the endo- and epi-neurium, may, in a hyperplastic condition, separate the component lamellæ of the third, the

perineurium, by simply growing between them. If such an encroachment takes place from the side of the endoneurium, small bundles of nerve-fibres, enclosed by the latter, may be placed between the lamellæ of the perineurium, such as is represented in fig. 5, *e*. In this figure we behold the remains of a nervous fasciculus with the lamellæ of its perineurium separated by the hyperplastic endoneurium from a neighboring fasciculus, enclosing bundles of nerve-fibres. The whole fasciculus is seen to be broken up into very small primary bundles of nerve-fibres by the hyperplastic connective tissue of the endoneurium (fig. 5, *d*).

The separation of the lamellæ of the perineurium by the hyperplastic connective tissue of the endoneurium with small bundles of nerve-fibres inclosed, as I have demonstrated above, not only explains the presence of those bundles observed between these lamellæ in the section of the bulbous enlargement, but, moreover, also accounts for the disappearance of almost all the lamellar sheaths, and of the obliteration of the boundaries of the nervous fasciculi throughout the section. In the breaking up of these fasciculi into smaller bundles of nerve-fibres, as seen in fig. 5, the disarrangement of the lamellæ of the perineurium is not only effected by the encroaching hyperplastic connective tissue of the endoneurium, but also by that of the epineurium.

As the result of the hyperplasia pervading throughout all the connective-tissue elements of the bulbous enlargement, the characteristic features of the different envelopes of the nerves are almost entirely obliterated. Endo-, peri-, and epineurium have, as once remarked before, become fused into one another, so that the whole represents now but a single connective-tissue framework, enclosing the fragmentary bundles of nerve-fibres of the former original fasciculi, and extending throughout the entire bulbous swelling of the

nerve. The only distinctive feature still observed on this framework is that, like the original tissue, it is also built up by distinct connective-tissue layers, or lamellæ, which, similar to the original lamellar sheaths, surround, as seen in figs. 5 and 6, the larger and smaller bundles of nerve-fibres, derived from the original fasciculi of the nerve. But these layers do not run throughout the bulbous enlargement only in one direction; on the contrary, they frequently pass one another, in the form of bundles, more or less obliquely, as may be seen by referring to fig. 6, *c*, where the sections of the latter are indicated by short lines, or dots in the midst of the longitudinal bundles. Whilst, however, the hyperplastic connective tissue of the septa of the endoneurium, as well as that of the epineurium, appears arranged in layers, as just described, the fibrils of the hyperplastic fibrillar sheaths run still parallel with the long axis of the nerve fibres which they surround. In the transverse sections of the bundles of nerve-fibres, therefore, these fibrils are seen in the form of minute dots, or rings, representing their transverse sections. The difference in the appearance of the connective tissue of the fibrillar sheaths, and of that of the septa of the endoneurium, or of that of the epineurium, will be found sufficiently illustrated in fig. 6.

Throughout the whole hyperplastic connective tissue were found distributed a great number of proliferating small spindle-form or stellated cells with oval or round nuclei. In the transverse sections of the fascicular fragments of nerve-fibres (fig. 6, *a*), the form of these nuclei, scattered throughout the hyperplastic fibrillar sheath, appears round, while in the longitudinal sections of these bundles (fig. 6, *b*, and fig. 7) it appears oval.

With regard to the condition of the nerve-fibres embedded in the hyperplastic connective tissue above described, I may state, that I was *unable to discover any traces of degen-*

eration in their component parts. On the contrary, they showed distinctly everywhere their normal double contour, though they presented, in many places of their course, a varicose appearance (fig. 6, *b*, and fig. 7), which, to a certain extent, might be regarded as a deviation from the normal condition. The medullary sheath of these nerve-fibres was still rendered black by a weak solution of osmic acid, as shown in fig. 7.

There was a considerable number of blood-vessels met with, distributed throughout the hyperplastic tissue above described: they belonged to the smaller order of vessels, viz.: the arterioles, venules, and capillaries. Many of these vessels were filled with blood corpuscles, though the adventitia of the larger ones was observed to be also thickened by the hyperplasia, which affected the connective tissues already discussed. Judging, then, from the number and the condition of these vessels, we may presume that both the nervous and the connective-tissue elements were well supplied with blood.

In considering, now, the condition and nature of the histological elements of the bulbous enlargements of the tibial nerves in question, as revealed by my microscopical studies, I cannot but regard these enlargements as a product of a slow, inflammatory action; in other words, a hyperplasia of the connective-tissue elements of the nerve, caused by chronic neuritis. I chiefly base this view upon the fact that, notwithstanding the disarrangement of the original connective-tissue envelopes of the nerve, their characteristic structure was, to a certain extent, preserved throughout the hyperplastic tissue; and, furthermore, that no so-called embryonic tissue was anywhere met with. The whole process of the formation of the bulbous enlargements consisted in a simple increase, or hypertrophy, of the old, already existing connective tissue of the nerves.

The bulbous enlargements of the ends of the nerves in the stumps of amputated limbs have been regarded as one of the causes of the neuralgic pains which many patients suffer in their stumps, sometimes throughout the rest of their lives. Not knowing any thing of the ante-mortem history of the patient from whose stump I took the material for the above-described studies, I am unable to say whether he was subject to these pains or not. But, judging from the pressure which, in his case, the hyperplastic connective tissue of the bulbous enlargements must have made upon the apparently normal nerve-fibres, it is very probable that he also suffered, notwithstanding the rest of the stump presented a healthy appearance.

Explanation of the Illustrations.

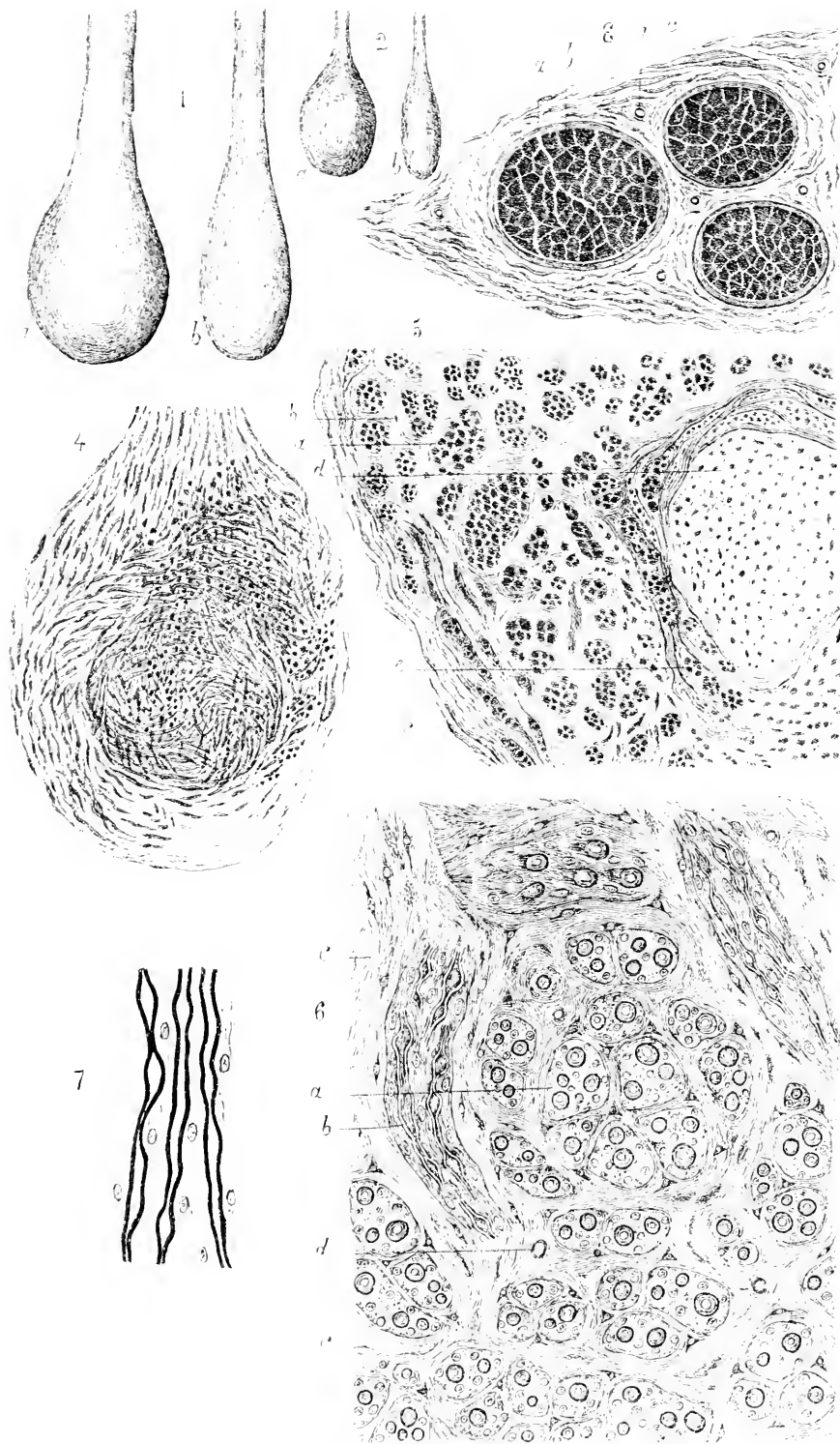
Fig. 1.—Bulbous enlargement of the posterior tibial nerve : *a*, front view ; *b*, side view (natural size).

Fig. 2.—Bulbous enlargement of the anterior tibial nerve : *a*, front view ; *b*, side view (natural size).

Fig. 3.—Small portion of a transverse section of a normal compound nerve, embracing three fasciculi of nerve-fibres : *a*, perineurium ; *b*, endoneurium ; *c*, epineurium ; *d*, blood-vessel (magnified about 25 diameters).

Fig. 4.—Longitudinal section of the bulbous enlargement of the anterior tibial nerve, illustrating the manner in which the ends of the nerves were enlarged, and how they assumed the form of a bulb, by showing the course of the fascicular fragments. These fragments of the nervous fasciculi, running in the bulbous enlargement in different directions, appear, of course, in the section cut either transversely or more or less oblique. The dots in the drawing represent the transverse sections of these fascicular fragments (magnified $4\frac{1}{2}$ diameters).

Fig. 5.—Small portion of a thin section taken from the middle of the bulbous enlargement, showing the distribution of the broken-up fasciculi throughout the hyperplastic connective tissue : *a*, fragments of the nervous fasciculi, cut transversely ; *b*, hyperplastic connective tissue of the the endo- and epi-neurium ; *c*, epineurium ; *d*, remains of a fasciculus ; its nerve-fibres have been subdivided into very small bundles by the hyperplasia of the endo-



drawn from nature & lith by the author

neurium ; *e*, bundles of nerve-fibres, carried by the hyperplastic endoneurium between the lamellæ of the perineurium (magnified 25 diameters).

Fig. 6.—Small portion of the section fig. 5, higher magnified : *a*, transverse section of a fascicular fragment, showing the transverse sections of five nerve-fibres, a number of nuclei embedded into the hyperplastic connective tissue of the fibrillar sheaths, and the transverse sections of the fibrils of the latter ; *b*, longitudinal section of a fragment of a fasciculus, showing nerve-fibres, nuclei, and fibrils of connective tissue in its interior ; *c*, hyperplastic connective tissue with its spindle form and stellated cells embedded ; *d*, blood-vessel (magnified about 400 diameters).

Fig. 7.—Small portion of a fascicular fragment with three nerve-fibres embedded in the hyperplastic connective tissue ; the preparation has been taken from a portion of the bulbous enlargement that had been put into a weak solution of osmic acid, which has rendered black the medullary sheaths of the nerve-fibres (magnified about 400 diameters).

MUSCLE- AND NERVE-ACTION.*

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UP to our day peculiar views were upheld by histologists, with regard to muscle- and nerve-tissue. L. Beale, in 1860, announced these tissues to be formed material, placing them on about the same level with the basis-substance of the connective tissue, though observation plainly shows that the tissues of muscle and nerve are the most active and energetic in the animal organism. We must necessarily consider them as formations of living matter, provided in a marked manner with all the properties of life.

The first accurate observer of the structure of tissues, Theodore Schwann, considered the striped muscle-fibers as composed of numerous delicate beaded fibrillæ, so that each muscle-fiber might be regarded as a primitive muscle-bundle. With Schwann the splitting of the muscle-fiber into longitudinal fibrillæ was the essential point. Later, Bowman demonstrated that under the influence of certain acids, the dilute nitric, lactic acid, stomachic juice, and others, the muscle-fiber would split transversely into discs, each of which was composed of a number of prismatic pieces, the sarcous elements. Preservation in alcohol, according to the last-named observer, would favor the splitting of the mus-

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cle-fiber into longitudinal fibrillæ; but neither the transverse nor the longitudinal divisions exactly correspond to the structure of a muscle-fiber, which we must consider as being composed of two substances, a contractile and a non-contractile substance, the splitting of which in one main direction would merely be the result of reagents. Bowman's views were adopted by E. Brücke. This observer claimed that the rows of sarcous elements within a muscle-fiber are by no means unchangeable formations, but their grouping during life greatly varies, in at least nine different situations, whereas we see the sarcous elements under the microscope in a certain group that preserved its shape in the moment of the death of the muscle-fiber. Brücke's views must be considered correct so far as they prove that in the muscle-fiber there are but two principal substances, a contractile and a non-contractile, the former being represented by the rows of sarcous elements (double refracting substance), the latter by an interstitial substance (simple refracting substance). All later assertions concerning the structure of the muscle-fiber we regard as unnecessary complications of this, comparatively simple, structure, their number having lately increased to such an extent that some physiologists mention at least, six different substances as existing within the muscle-fiber.

In 1873, I proved that all the sarcous elements, whatever their mutual arrangement, are connected with each other by means of delicate fibrillæ, both in longitudinal and transverse directions. Thus, the muscle-fiber is built up after the plan of a single "protoplasmic" body, which we know to be traversed, at a certain stage of development, by a delicate reticulum. The reticulum I demonstrated to be living matter, and, accordingly, the sarcous elements and their connecting threads are formations of the living or contractile matter in a regular reticular arrangement; whereas

the fluid or semi-fluid substance, filling the meshes of the reticulum, is the non-contractile or non-living portion of the "protoplasm" in general, and also of the muscle-fiber. Contractility, the attribute of life, will be preserved in the muscle so long as the sarcous elements remain inter-connected, regardless of their mutual arrangement. Not infrequently we are unable to discern in fresh muscle-fiber any structure at all, the sarcous elements becoming visible only after a certain period. Again, temporarily the sarcous elements may be irregularly scattered through the fiber, or portions of it, and, nevertheless, the power of contractility is fully preserved, as proved by the application of the interrupted electric current. It is not correct, to assert that the muscle-fiber presents a certain constant and regular arrangement of the sarcous elements, and to say, for instance, that a broad row of sarcous elements is followed by a narrow or granular row, or two narrow rows are arranged between two broad rows, and so on; for the most common feature under the microscope is, should the sarcous elements be discernible at all, that broad rows of sarcous elements are separated from each other by light interstices, varying in diameter, at pretty regular intervals. The filamentous connections between the sarcous elements likewise vary in their aspect at different times, those running transversely from a sarcous element to all its neighbors being plainly visible only exceptionally, on account of the extremely narrow interstices, between the sarcous elements in the transverse direction. The longitudinal filaments may pass from the middle of a sarcous element to that of the nearest upper and lower one, giving each formation a fusiform appearance. Not infrequently, however, the longitudinal filaments pass from the periphery of one sarcous element to that of its neighbors, there being an apparent double connection of each of these bodies with the adjacent upper and lower one.

Such a double connection would also admit of a different interpretation, viz., that a solid sarcoous element was followed upward and downward by a hollow vacuole, filled with liquid, the walls of the vacuole being visible only at both edges, though really encircling the vacuole. In this conception of the structure the solid, prismatic pieces of the contractile substance were alternately followed by spaces, filled with liquid, and bordered by extremely thin layers of living matter.

Whatever the arrangement of the sarcoous elements be, the contraction of the fiber will exhibit exactly the same features as are visible in a contracted portion of a lump of protoplasm, an *amœba*, for instance. The granules or prisms become thickened, more bulky, the connecting threads become shortened, as the interstices are rendered narrower, and consequently the meshes between the sarcoous elements decrease in size. The result of such a contraction consists in a shortening and broadening of the whole muscle-fiber. On the contrary, in the state of expansion the prisms become narrower, slightly elongated, the filaments are expanded, and the meshes enlarged. The extended muscle-fiber will accordingly be thinned and elongated. The process of contraction and extension performs its function in different portions of the body of a single "protoplasmic" lump, while in the muscle-tissue groups of fibers are in contraction, other groups, simultaneously, in extension. Upon this division of labor is obviously based the antagonism of the muscle-groups.

The nerve-tissue, according to our present views, must be largely constructed of living matter in all its central, conducting, and peripheral portions, for it is endowed with a high degree of activity, the so-called "vital force." The true central portion of the nervous system is the gray substance, and in this, as many good observers maintain,

only the ganglionic elements, the so-called "ganglion-cells," are the active parts. Within these elements the living matter is arranged in the form of a reticulum, first described by Frommann. The same arrangement is visible all through the gray substance, as I first observed in 1874, and is now fully acknowledged by S. Stricker. The broadest axis-cylinders likewise exhibit a delicate reticular structure; whereas, in the narrow ones light and dark fields are discernible only, the former being possibly accumulations of a liquid, *i. e.*, vacuoles. The fine staxis-cylinders, with our best modern microscopes, do not exhibit any structural differences. In the terminal axis-fibrillæ a beaded, rosary-like appearance is the most common feature, which would allow the conclusion that the reticulum is arranged in its simplest form, that of threads.

In looking over the reticulum throughout the nervous system, we are at once struck by the delicacy of the granules—*i. e.*, the points of intersection of the net-work. In comparison with the muscle-tissue the difference is apparent. Here we have bulky, prismatic points of intersection, the sarcous elements; in the nerve-tissue, delicate granular thickenings only. The contraction of the former, in all evidence, will be slow but powerful, resulting in intense mechanical work; in the latter the contraction will be quick, starting in the ganglionic elements and running to the periphery, or in the opposite direction, from the periphery to the centre. The nerve-action is possibly based upon this rapid contraction of the living matter, and the isolated conduction thereof through the connective tissue of the body, the general carrier of nerves. We are at a loss, however, to explain the conduction of nervous impulse through the finest axis-cylinders and axis-fibrillæ.

All physiologists admit that the centres of nervous activ-

ity are the ganglionic elements scattered throughout the gray substance. We realize that a contraction of the reticulum of the living matter, starting at a peripheral portion of the body, will run a centripetal course and result in a sensitive or sensory perception. A contraction starting, on the contrary, in a central ganglionic element and running to the periphery, to the motor apparatus, will be a motor impulse and result in motion. Both the centres of sensibility and motility are located in the gray substance in separate centres, though both centres are again inter-connected. From this point of view we hardly need speak of motor and sensitive nerves, for both exhibit the same structure and, as experiments directly prove, may be fit for either motor or sensitive conduction, according to the centripetal or centrifugal direction of the impulse. It will suffice, then, to speak of sensitive and motor centres, or ganglionic elements, which must necessarily be inter-connected within the gray substance.

Far more divergent views are expressed regarding the physiological dignity of the gray substance that surrounds the ganglionic elements. Meynert and Stricker consider this substance as inert, as connective tissue, without the property of nervous action. Ewald and Kühne take this substance for keratoid or horny material, as they failed in obtaining its digestion by tripsine. The large number of globular and oblong nuclei scattered throughout the gray substance would certainly indicate a high degree of vitality of the gray substance and disprove the theory of its being neuroglia or connective tissue. Stricker admits that under certain conditions ganglionic elements may originate from the nuclei of the gray substance. Spina has demonstrated that in thin sections of this substance, removed from freshly killed animals and transferred to the slide with an indifferent liquid, such as blood-serum, a very active

motion is visible in the reticulum, while the medullated nerve-fibers, which according to Exner traverse the gray substance in large numbers, remain unchanged. Observation of the process of encephalitis under the microscope directly shows that inflammatory corpuscles originate from the points of intersection of the net-work of this substance, the same as from the ganglionic elements. All this goes to prove an active participation of the gray substance in the function of the nerve-centres. The question, whether we have to deal here with connective tissue or nerve tissue proper, probably will never be satisfactorily answered, for we have no means to accurately determine the properties of either in their transitional forms, especially if basis-substance, the characteristic feature of connective tissue, be entirely absent, as in the gray substance.

The terminations of sensitive and vasomotor nerve-fibers are accurately studied in different portions and organs of the body. We know that the fibers take their course to all epithelial layers covering the surface of the body, lining the cavities, and producing glandular prolongations. We meet with such fibers in surprisingly large numbers in the cement-substance between the epithelia, exclusive, of course, of horny epithelia which are destitute of the properties of life. We see the nerve-fibers in direct communication with the transverse fibrillæ of living matter, the so-called thorns, which inter-connect all neighboring epithelia. We realize that the nerve-impulse can be directly transmitted from the connecting filaments of the epithelia into the interior of the latter, which likewise exhibit a reticular or filamentous structure. Should the contraction of this reticulum start in the interior of the epithelia, we understand its transmission to the nerve-fibres, running between the epithelia, to be the perception of sensation by centripetal conduction. Whether or not

axis-fibrillæ ever enter the interior of the epithelia, is a much vexed but undecided question. For connective-tissue corpuscles such a penetration of axis-fibrillæ cannot be doubted, as W. Hassloch has, in my laboratory, plainly demonstrated such a penetration and pervasion of axis-fibrillæ into and through the cornea-corpuscles. He traced the ultimate fibrillæ even into the basis-substance. Both here and in the cornea-corpuscles the axis-fibrillæ are in uninterrupted connection with the reticulum of the living matter. Similar observations were made in the connective tissue of the capsules of articulations by Nicoladoni.

Far more difficulty was experienced in the explanation of the action of motor nerve-fibers, which, as we know since Doyère's discovery, do not penetrate the muscle-fibers, but terminate on their surface in the shape of a branching plexus, or a plate, or a hill. Most of the histologists agree that this termination occurs beneath the sarcolemma-sheath. Brücke announced, over twenty years ago, that the rows of the sarcous elements may be compared to rows of soldiers, who, according to the command of the colonel, the motor nerve, may at any time change their mutual arrangement. Kühne has considered the muscle-tissue as a direct prolongation or expansion of the nerves. But how could these conceptions be admitted so long as there was no connection either supposed or demonstrated between the nerves and the sarcous elements? If every muscle-fiber is provided with but one or two nerve-terminations in its whole length, how could we explain the transmission of the motor impulse into the fiber, which certainly contracts all through its length with a certain degree of rapidity?

Until quite recently, on the muscles of different animals, three varieties of terminal apparatus were described—viz.,

the terminal nerve-hill in the arthropoda ; the nerve-tuft in amphibia, and the terminal nerve-plate in reptiles, birds, and mammals. Kühne especially lay stress upon the difference between terminal tufts and plates. Two years ago, however, L. Bremer demonstrated that in the frog and lizard a variety of transitional forms occurs between the main types of Kühne. Bremer found sometimes two medullated nerves entering the same terminal apparatus, also non-medullated nerve-fibers, either connected with the medullated ones in a plexiform arrangement, or producing umbellated terminal apparatus—such as have been mentioned previously by Tschierew. According to Kühne, in the motor plates of all higher animals the surface is occupied by a broad-fused layer of medullated nerves. Gerlach first described a delicate fibrous reticulum within the hill, the presence of which was doubted by later observers. But from what I have seen, it would seem there could be no doubt as to the direct union of the axis-cylinders with the delicate net-work in the depths of the motor hill, which net-work is again in connection, by means of delicate threads, with the neighboring sarcous elements. How the branching plexiform, medullated, and the non-medullated, probably sensitive, nerves join the contractile matter of the muscle, is as yet unknown.

Thus a direct connection is established between the muscle and the motor nerve, and, as all sarcous elements within the muscle-fiber are again inter-connected, a continuity of the living matter is established from the motor centre, the motor ganglionic elements, to the muscle-fiber,—that is to say, its sarcous elements. We are now prepared to understand how the impulse of the colonel—the motor nerve—is directly transmitted to the regiment of soldiers—the rows of the sarcous elements. If we are pleased to accept Kühne's view, that the muscle is an expansion of the

nerve, there is no obstacle, inasmuch as both the muscle and the nerve are formations of living matter.

The ultimate question is: What causes the motion of the living matter? The forms of motion dependent on the contractility or irritability of living matter, are controlled by complex laws, which we term the "will" and the "spontaneity" of living matter. According to M. Foster, the term "automatic motion" is preferable to "spontaneous," inasmuch as it does not necessarily carry with it the idea of irregularity, and bears no reference to a "will." This automatic motion is characteristic of any living organism, the simplest *amœba*, as well as the most complicated mammal. To call the cause of this motion "vital force," is a mere transcription of the facts, but no explanation. I. Fletcher, in 1835, was the first who absolutely abandoned the idea that the material elements of an organism require the addition of an immaterial or spiritual essence, substance, or power, general or local, whose presence is the efficient cause of life, and who arrived at the conclusion that it is only in virtue of a specially living matter, universally diffused and intimately interwoven with its texture, that any tissue or part possesses vitality. Among all tissues, the muscles and nerves are richest in living matter, hence, the most active. The power that makes these tissues move and contract lacks definition.

KNEE-PHENOMENON IN LOCOMOTOR ATAXIA— A CLINICAL CONTRIBUTION.

By PHILIP ZENNER, A.M., M.D.,

CINCINNATI, O.

THE following history would be more valuable if it covered a longer period of observation or were accompanied by the results of a post-mortem examination. But the case was seen in a town in the interior of Ohio, and will probably not be seen by me again. I therefore give it as I found it, on account of the interest attached to it, and the important inferences which, I believe, can be drawn from it.

H. C., aged forty. Railroad employee. Had a chancre twenty years since, which, so far as he knows, was not followed by any symptoms of constitutional syphilis. Has had occasional attacks of pain in left shoulder and arm for four years or longer. This pain is usually deep-seated, aching in character, sometimes lancinating, and continuing more or less constantly for days or weeks at a time. He thinks that, until a few months ago, he had suffered less with these pains during the last two years, than in the years just preceding them.

Four months previous to my seeing him he had an unusually severe attack of pain, and about the same time he noticed the first motor symptoms, weakness in left arm, especially in shoulder and elbow, and impaired gait. The motor disturbances, slight when first observed, have been pretty rapidly increasing. He has also had some difficulty in urination, and observed a sensation of numbness in the hands.

On examination of the patient there appears to be no involve-

ment of the cerebral nerves ; eyes are normal. Patient speaks of numbness in the hands, and an objective examination reveals decided diminution of cutaneous sensibility in that part. On the palmar surface of the fingers two points can only be detected when about two inches apart. At other parts impairment of sensibility can not be determined with certainty, though sensation seems to be more acute over the upper than the lower part of the trunk ; and, while there is no parasthesia anywhere, and sensation in the lower extremities seems unimpaired, yet the presence of the Brach-Romberg symptom makes it probable that, at least over the soles of the feet, sensation is also diminished.

There is a quite apparent atrophy of the muscles of the left upper extremity, most marked in the deltoid and muscles of the thumb. The circumference of arm above elbow is $\frac{3}{4}$ inch less on the left than on the right side. There is slightly marked the *main en Griffe* of Duchenne. The muscles everywhere responded to the faradic current, though far less vigorously than on the other side, the force of the contractions being perhaps proportionate to the amount of muscular tissue present. (I regret that I had not the means of testing muscles with constant current.)

There is almost complete paralysis of left hand and arm. He cannot move the arm at the shoulder, very slightly at the elbow, and there is a very feeble grasp. The paralysis seems to be greater than could be accounted for by the muscular atrophy.

Power in right arm and hand evidently diminished, though no decided paresis. Same is true of the lower extremities, though somewhat less in the left than in the right side.

The gait is quite ataxic ; but apart from the jerky, irregular steps, it is observed that the left foot sometimes drags on the floor.

There is also ataxia of movement in the right arm. On trying to touch a point, as the nose, finger vacillates, and succeeds with difficulty in reaching its aim.

The patellar tender reflex is well marked, perhaps excessive, on both sides, but a foot clonus can not be distinctly elicited.

Comments.—The statement has not infrequently been made that the patellar tendon reflex is sometimes retained in cases of locomotor ataxia. If such would prove to be a common occurrence, it would diminish the great significance attached to this sign in recent years. The case just reported

might be added to this list, and it is especially to consider it in this relation that it has been reported. The diagnosis—locomotor ataxia—had been made previous to my seeing it, a diagnosis which would doubtless have been made by the majority of physicians. Yet the rapid development of the disease, the degree and distribution of muscular atrophy and paralysis at so early a period, together with the insignificance of the sensory symptoms, rendered the correctness of such a diagnosis exceedingly doubtful. It is more probable that we have to do with a diffuse myelitis. At least, we can state that more than one system in the cord is affected, and if the disease be locomotor ataxia, its development different from the usual one. While usually the pathological changes begin in the lumbar region, and therefore the absence of the patellar tendon reflex is among the first symptoms, we need not hesitate to affirm that in our case the Burdach's columns in lumbar region are altogether, or almost altogether, intact.

I have given the case in detail with the hope of eliciting full histories in other instances where the patellar tendon reflex can be obtained in cases of locomotor ataxia. From my own experience, both as to the absence of this phenomenon and the character of ataxic cases in which I have found it present, I feel convinced that in all such cases the diagnosis will be at the best doubtful, or at least, the course of the disease an unusual one.

I have dwelt upon this point because it seems to me that we scarcely have a symptom or sign of disease of more positive diagnostic value, or which will more frequently throw light upon an obscure case.

NEW YORK NEUROLOGICAL SOCIETY.

Stated Meeting, January 8, 1884.

WILLIAM J. MORTON, President, in the chair.

After a "Brief Note on the Use of the Menthol Cone as an Anodyne," by Dr. E. C. WENDT, and a discussion upon the same, the paper of the evening, entitled "Detention in Asylums," was read by its author, Dr. RALPH L. PARSONS. This paper is published in the January number of the JOURNAL. Owing to the lateness of the hour, discussion upon the paper was deferred until the next meeting of the Society.

Stated Meeting, February 3, 1884.

In the absence of the President, Dr. William J. Morton, the 1st Vice-President, Dr. LEONARD WEBER, occupied the chair.

After the minutes of the previous meeting had been read and adopted, the following physicians were unanimously elected to active membership: Drs. W. M. Leszynsky; C. E. Nelson; T. G. Jonson, of Brooklyn; Grace Peckham, of New York; Henry D. Chapin, of New York; Charles Heitzman, of New York, and Alexander S. Hunter, of New York.

The discussion of Dr. Parsons' paper (postponed from the previous meeting) now being in order, the President called upon Dr. HAMMOND, who said:

It is difficult to discuss a paper you agree with; but I have seen so many cases which bear out every remark Dr. Parsons has made, that I cannot differ with him. The speaker related a case where there was no evidence of insanity, but the individual was put to an expensive trial, costing several thousand dollars, before liberty was regained.

Daily reading of the Bible has been accounted an evidence of insanity, necessitating detention in an asylum. It is dangerous to be wealthy; people wish to take care of your property. Persons should only be confined in asylums on evidences of insanity. There should be a movement inaugurated to establish alienist hospitals, similar in establishment and organization to ordinary hospitals; I was the first to promulgate this idea, even before its advocacy in England. I propose to recognize a lunatic as a patient, and not as a lunatic. I do not recommend the placing a lunatic in the family of any person but in the family of a physician; any form of lunacy, malignant or not, requires constant supervision. There are a great many forms of derangement; placing a person with undecided symptoms in a ward with eighty or ninety lunatics, would likely cause his reason to tremble in the balance. There is little classification in this country as regards lunatics; so that, from association, patients become worse than they would otherwise be. I should educate physicians in a special manner to take care of these people, so that they would know as much about treating lunatics as they do of treating ordinary diseases. It is only a theory that we cannot do without asylums.

Dr. A. D. ROCKWELL said: It was a characteristic remark of old Dr. Johnson, and with much true philosophy in it, that "every man is a rascal when he is sick," *and if a rascal, why not insane?*

Prostration of the physical forces certainly causes perversion of the intellectual and reasoning faculties, as well as of the moral. The suggestion seems to be, that the condition of insanity is one of degree, and that the recognition of this fact should regulate and restrain commitments to asylums far more than it ever has done. Some time ago a patient of mine was committed to an asylum, but against most earnest protestations on my part. The chief evidences of insanity were a tendency to give away small sums of money rather freely, and a morbid fear that he might in some way cheat or injure somebody. The depressing influences of his surroundings tended to develop morbid fears of a far more unpleasant character, until finally he was returned to his home, with the result of immediate improvement.

Many physicians undoubtedly have had experiences of this kind, and I therefore quite agree with Dr. Hammond, that the insane should be regarded more in the light of patients than of lunatics, and treated accordingly.

After some further remarks by other members, Dr. Parsons closed the discussion, and Dr. Hammond proceeded to read a paper on the peculiar nervous condition, styled in Siberia *myriachit*; the chief feature of which is, that the victims are obliged to mimic and execute movements that they see in others, and which motions they are ordered to execute.

A similar condition was observed by Dr. Beard, in June, 1880, when travelling among the Maine hunters, near Moosehead Lake. These men are called "jumpers" or "jumping Frenchmen." Dr. Hammond thought that this condition is identical with *myriachit*, observed by the U. S. naval expedition, which landed and made explorations in Corea. Those subject to this affection start when any sudden noise reaches the ears.

Stated Meeting, March 4, 1884.

WILLIAM J. MORTON, President, in the chair.

Dr. C. L. DANA read a paper upon "Morbid Somnolence," relating a number of histories illustrating different forms of this affection.¹ These forms he classified as follows:

1. Epileptoid sleeping states.
2. Hysteroid sleeping states, including (a) spontaneous "mesmeric" sleep; (b) trance and lethargic states.
3. Morbid somnolence, the expression of a distinct neurosis (narcolepsy).

The speaker's first case (illustrating class 3) was that of a young man of healthy family and personal history, who would go to bed at the ordinary hour and could not be aroused till noon, or afternoon, or evening of the next day. This would so continue for a week or two when the symptoms would remit.

A second case (illustrating class 2) was that of a young lady who had short attacks of catalepsy, cataleptic *petit mal*.

¹ This paper appears in full in this number of the JOURNAL.

alternating with sudden attacks of sleep. These came on several times daily.

Three other cases (illustrating class 3) were of neurasthenic persons who, for several months, had persistent drowsiness, not attributable to any nutritive or organic disorder.

Dr. DANA also reported a case furnished by Dr. L. Putzel, illustrating the epileptoid sleeping states.

Discussion on Dr. Dana's paper :

Dr. WM. M. LESZYNSKY: I know of two cases which might be termed a mild form of morbid somnolence, where the patient would fall asleep at almost any hour of the day while reading or conversing, the sleep lasting at times for an hour or more.

The cause of this somnolence seemed to me to be undoubtedly due to the faulty assimilation of food, and was cured by the use of nitro-muriatic acid, etc.

Dr. WEBER: I have seen but a few cases. In *diabetes*, morbid somnolence is believed to be a prominent symptom; I have seen twenty or thirty of such cases, well pronounced, but have not seen one case where morbid somnolence prevailed; on the contrary, the patient did not sleep as much as normal.

I remember two cases of *locomotor ataxia*, in which there was a great tendency to prolonged sleep; in one of these cases, the man would sleep often fifteen hours at a time. I have observed sopor in chronic endarteritis, in a number of cases, especially, in cases where the condition of cerebral arteries tends to apoplexy. There was one man who would fall asleep during dinner, be taken up to bed, and there sleep till the next day.

Drs. ROBERTS and C. E. NELSON made remarks, giving cases as to making up sleep-time after prolonged vigil; Dr. Roberts remarked that sopor was met with in his case of myxœdema, read previously before this society, and published in this journal; in such cases, sopor is recognized as a symptom of disease.

Dr. SHAW (of Brooklyn) related a case of a man who would fall asleep in the clinic.

Dr. R. B. PRESCOTT said: I have one case bearing on this subject, Mr. President, which came into mind while Dr. Dana was reading his paper, and which, as it may not be altogether without interest, I will relate. It is that of

A farmer, unmarried, forty years of age or more, living in a small village in Massachusetts, who, some ten years ago, began, without any apparent cause, to be troubled with excessive drowsiness. It manifested itself first in a disposition to sleep unseasonably long in the morning. He would remain in bed until long after the breakfast hour, and complain at intervals during the day of still feeling sleepy. Gradually he came to neglect the work of his farm, and remained about the house dozing away a considerable portion of the time. His social nature, too, underwent a decided change. He became reserved and silent. He shunned all intercourse with friends and acquaintances, was with difficulty made even to answer ordinary questions, and was easily moved to tears. On one occasion I was told he fell asleep on his wagon while taking a load of produce to the nearest market town, and slept soundly for many hours, his horse having of his own will, taken an unfrequented road and finally stopped at the place where he was discovered, the driver still fast asleep.

His condition at present is that of a gradually deepening mental lethargy. He passes a large portion of his time in bed, and takes little interest in what takes place around him, though at times he partially arouses and will read the newspapers or carry on a brief conversation—mainly in monosyllabic replies to questions. His bodily functions are all normal and there is no evidence of any physical disease. His general health was good up to the time of the appearance of this morbid somnolency, and he is not the subject of any hereditary taint, so far as known. He is now regarded by those who know him as mildly insane, and his recovery is not expected.

The PRESIDENT said: I have seen and treated but one of these very peculiar cases which I should be willing, following Dr. Dana's lines of diagnosis, to classify as true Morbid Somnolence. Of course those who sleep after prolonged forced wakefulness do not fall within the author's categories. As an instance of simple sleep of this nature I well remember of sleeping twenty-four hours without a moment of recollected consciousness after two days and two nights in the saddle during a time of danger. This may be said to be simply normal somnolence. The case

of *morbid* somnolence I refer to was that of a physician in this city, who had suffered from this condition for fifteen years. He was habitually overcome by an incontrollable desire to sleep during the day-time, no matter how malapropos the time or place; this desire he would fight against with all his power of control, but would finally yield to sleep. Even in the dentist's chair while a sensitive tooth was being "scraped" he had fallen asleep. Often in the rounds of daily practice he would feel this lethargy creeping over him, at critical moments, as, for instance, when his services were most needed at a confinement, and would be forced to yield to it and sleep. It was impossible for the same reason for him to read or study. In fact life was becoming to him a soporific blank.

Other symptoms were forgetfulness, frontal and occipital headache, a general malaise, great sense of weariness, palpitation of the heart on active exercise, and prostatic irritation. He had been examined time and time again by friends of eminence in the medical profession, for organic disease, and none existed. The urine especially had been the subject of careful tests. I repeated these examinations with no better results. Malaria was out of the question. I treated this patient on the basis of a profound anæmia—gave him large and increasing doses of iron (Blaud's pills) until he was taking 30 grains three times daily; gave him additionally, Glonoin. Under this treatment he improved wonderfully, and at his last visit several months ago, he reported that he seldom fell asleep during the day.

Dr. DANA, in closing the discussion, gave a similar case to the English farmer; this case would have periods of remission for several years. These cases are supposed to end in insanity. There is persistent drowsiness in *diabetes*, and in *syphilis*; also, previous to attacks of *epilepsy*. There is recognized a "sleeping sickness" in Africa; the French authority, Ballet, mentions these conditions.

Second Paper—Treatment of Wry Neck by sulphate of atropia. By W. M. LESZYNSKY, M.D.

The reader related the history in the case of a young woman who, owing to the fact that her occupation was that of a book-folder, was obliged to turn her head very frequently

toward the *left* side. The right sterno-cleido-mastoid and trapezius muscles became affected with a very severe form of clonic spasm which almost exhausted the strength of the patient. The treatment adopted was the daily injection of sulphate of atropia into the contracting muscles, beginning with gr. $\frac{1}{80}$, and gradually increasing to gr. $\frac{1}{5}$, which maximum dose was continued four days, when recovery supervened. In addition to the atropia galvanism was used, and the faradic current was applied to the opposite side.

DISCUSSION.

Dr. J. C. SHAW—I have been called three times in consultation in these cases, where atropine was used; there was a great deal of pain, and marked neuropathic tendency; insanity in the family in one case. There is one difficulty in the treatment by atropine, that it causes disagreeable symptoms, especially in delicate women. In one case, where the drug was pushed, it caused such distress that the patient, a woman, refused to take it longer. Atropine in large doses cannot be used in all cases therefore.

Dr. C. L. DANA said that Dr. Leszynsky was entitled to great credit in employing atropia against such physiological odds. He believed that the cure was due to the employment of atropia. One point must be borne in mind, and that is that we must select our cases. In those cases where the disease is plainly neurosis, atropine may answer. In many cases, however, the disease appears to be of a peripheral and rheumatic character. Here anti-rheumatic remedies answer better.

Dr. GIBNEY: In view of the fact that Dr. Leszynsky administered electricity and other agents, as his report shows, some doubt might be expressed as to the curative effects of the atropine injections. The relationship of cause and effect does not seem sharply enough defined. I have had no personal experience with this drug in torticollis. A few years ago, in a case of rotary spasm of the head, I had very prompt and excellent result in the use of the fluid extract of gelsemium carried to tonic doses. Dr. Leszynsky certainly deserves credit for the heroic dosage of atropine in this case.

Dr. BIRDSALL related the history of a case of torticollis, treated at the Manhattan Hospital by his assistant, Dr. Terriberry, in a child about eight years of age, by the application of as strong a galvanic current as could be endured for from twenty to thirty minutes on the affected muscles, three times a week for several weeks, with gradual improvement, which finally terminated in complete recovery. During the last two weeks, Tr. of belladonna was administered in drop doses, until slight physiological effects were produced. Dr. Birdsall was inclined to credit the curative effect in this case mainly to the galvanism, though he thought that a combination of the method with atropia and that of galvanism would in general be far more serviceable than either alone.

Dr. WEBER: Was a traumatic effect produced by the hypodermic injections?

Dr. LESZYNSKY: The injections were made into the substance of the muscle, and no traumatic effect was produced. The preparation of atropia used was Merck's, and the solution was freshly prepared every two or three days.

Remarks of Dr. DAVID WEBSTER:

Mr. President: I have listened to Dr. Leszynsky's paper with much interest. Although I have seen but few cases of wry neck, I have had a good deal of experience with atropine, and I beg leave to question whether the same results might not have been accomplished by smaller doses applied locally. For the purpose of relaxing the sphinctre pupillæ and the ciliary muscle we never give atropia by the mouth or hypodermically, but always apply it locally to the surface of the eyeball. Less than one twenty-thousandth of a grain applied to the conjunctiva will paralyze the muscles I have named, while it would require a many times larger dose to produce the same effect if given hypodermically.

It is remarkable that Dr. Leszynsky's patient tolerated so large a dose as one sixth of a grain. There is a wide difference in the quantity required to produce the physiological effects of the drug in different persons. I have frequently seen a drop of a four-grain solution, applied to the eye, produce the peculiar scarlet flushing of the face, especially in infants. I also know of a case in which a single drop in

the eye caused marked delirium in a young lady, so that she had to be taken home in a carriage.

I have had some *personal* experience with the physiological effects of atropia. I once swallowed what I supposed to be ten drops of Magendie's solution of morphia to check a diarrhœa while I went to Brooklyn to assist in an enucleation. On the way I noticed that I felt very strangely, going off into curious dreams, entering into imaginary conversations, etc. When I got to the place of operation, I found, on attempting to talk, that I could scarcely speak above a whisper, my mouth and throat were so dry. Dr. Agnew noticed that my face was flushed and my pupils dilated. I went home and went to bed, and slept soundly until the next morning. As soon as I awoke it dawned upon me that I must have taken atropine instead of morphine. As soon as I saw Dr. Agnew, he told me he had arrived at the same conclusion. I found the atropine and morphine bottles side by side on my table. The mystery was explained.

I once saw a case in the practice of a brother practitioner where one sixtieth of a grain of sulphate of atropia given with half a grain of morphia subcutaneously produced delirium lasting for half a day or more. This was in a hysterical lady, who was used to hypodermics of morphia without atropia.

Dr. Leszynsky's method of giving the drug was a perfectly safe one, however, as he cautiously felt his way from smaller to larger doses.

Dr. G. W. JACOBY said: It was not my intention to make any remarks upon this subject, as the objection which I intended to raise to the indiscriminate employment of galvanism and atropine in the treatment of Dr. L.'s case, has already been made by some of the preceding speakers; but Dr. Gibney's remarks in reference to the facility of producing physiological effects of atropine, in some cases, by very minute doses, recall to my mind very vividly a case in which this was also very noticeable. The patient, a girl aged twelve years, came to me affected with a left-sided tonic torticollis, probably of rheumatic origin.

My results with electricity upon other cases having been

unsatisfactory, I determined to treat this case by the hypodermic injection of sulphate of atropia. I therefore injected $\frac{1}{30}$ th of a grain of the drug.

This one injection produced all the symptoms of atropine poisoning, ending in a violent delirium which lasted for ten hours.

When the patient had recovered from the effects of the atropine, I naturally felt reluctant to continue its use, and began treatment of the torticollis by galvanism. After two weeks, the child was discharged from treatment entirely recovered.

The points that I wish to mark are, firstly, the small amount of atropine necessary in this case to produce delirium; and, secondly, the fact of a cure by self-limitation, or possibly through the action of the galvanic current. Had no ill effects resulted from the use of the atropia, I would probably have continued its use, and my patient recovering, it would have been only natural to attribute this recovery to the use of the atropine.

Therefore we cannot be too cautious in drawing conclusions from a single case, no matter how well observed, and we should be very careful not to use two potent remedies such as galvanism and atropine simultaneously, as our scepticism in regard to the efficiency of either one will not be considered scientific proof of the beneficial action of the other.

Dr. LESZYNSKY in closing the discussion, said: As Dr. Dana saw the patient referred to in my paper, I am pleased to hear that he agrees with me in stating that recovery was due to the employment of the atropia.

In reporting the history of this case, I expected that the question would arise as to which of the remedies employed had effected the cure, therefore I was not surprised to hear the criticism of Drs. Gibney and Jacoby, and in reply I will state that the number of cells used in applying the galvanic current was from ten to twenty of a Stohrer portable battery. The patient could not tolerate a stronger application, and this was continued for nearly fifteen minutes daily. After the removal of the electrodes, I found that the spasm invariably became more vigorous than ever, and I always allowed

about ten minutes to elapse before injecting the atropia.

I would again direct the attention of the society to the fact that, notwithstanding the daily application of galvanism in conjunction with the use of atropia, *no improvement was shown until the twentieth day. Soon after a rapid increase of the atropia from gr. $\frac{1}{30}$ to nearly gr. $\frac{1}{8}$.* Then the improvement became so evident that it can hardly be doubted that the atropia was the important element which effected the successful result. In regard to the use of the bromide of sodium, I can safely say that bromism was not produced. The faucial reflex was frequently tested and remained well, marked throughout the entire course of treatment.

Dr. Webster's suggestion may be a very good one if we accept it from an ophthalmological standpoint, but in this class of cases I cannot see what advantage could be gained by the inunction of the oleate of atropia. The object in using this sulphate of atropia was to produce paralysis of the trunk and branches of the spinal accessory nerve, therefore it was injected into the substance of the muscle for the purpose of producing its *local effects* on the motor nerve, although eminent authorities like Ringer and Traser have concluded, after an elaborate series of experiments upon living animals, that atropia paralyzes the motor nerves through its action upon the spinal cord, and not by its action through the circulation. I believe that the oleate if applied locally, would produce more rapid constitutional symptoms on account of its speedy absorption; and another objection is that the dose cannot be so accurately determined.

In conclusion I will state that the patient remains well, and that no sign nor symptom of spasm has since been shown.

Nomination of officers for ensuing year: President, Birdsell, Gray, Morton, W. A. Hammond.

First Vice President, C. L. Dana; Second Vice President, G. W. Jacoby; Recording Secretary, E. C. Wendt; Corresponding Secretary, W. M. Leszynsky; Treasurer, E. C. Harwood; Councillors [five], Weber, Seguin, Jacobi, Morton, W. A. Hammond, McBride.

The Society then adjourned.

PHILADELPHIA NEUROLOGICAL SOCIETY.

The first stated meeting was held, Monday evening, February 25, 1884, the Vice President, Dr. CHARLES K. MILLS, in the chair. Dr. Mills read a paper on "The McGinnis Case." A history of the case, including an account of the crime and a discussion of the formation, proceedings, and reports of the commission to inquire into the mental state of McGinnis was given.

The facts indicating the insanity of McGinnis were summarized by Dr. Mills, in the course of his paper as follows: A bad family history; evidences of the monomaniacal character, as shown by a study of his life and present condition; the existence of a delusional state, and even of special delusions of a depressing and persecutory type; the presence of hallucinations of hearing and sight, the former being connected largely with persecutive ideas; some manifestations of religious monomania; a history of alcoholism, and the fact that his chief delusion, that of marital infidelity, was one often found in chronic alcoholic insanity.

The next paper was entitled: "Case of Unilateral Spasm, Hemiplegia, and Aphasia, following Measles in a Child Two Years and Four Months Old," by LAMBERT OTT, M.D., Assistant in the Nervous Department of the Post-Graduate Course of the Jefferson Medical College.

Boy, aged two years and four months, healthy and intelligent, talked well for one of his years. April 2d, he had a mild attack of mumps. Seven days later he was seized with premonitory symptoms which ushered in a well defined attack of measles. Other children in the same house were just convalescing from this exanthema. No physician was called, and nothing more was done than keeping him warm in bed and administering an occa-

sional purgative. On the tenth day after the beginning of the disease, the mother states that he felt well, was laughing and playing in bed, but instead of the dull yellowish stains which remain after the papules of measles have faded, his skin was dotted with spots of a purplish hue. The same morning the mother noticed a twitching of the muscles of the right eye and right side of face, and soon after similar movements of the right arm and leg. He remained conscious during the spasm, but was unable to speak, motioning for any thing he wanted. After the spasm had existed an hour, the leg ceased to move, and was found to be paralyzed. Half an hour later the arm-jerk stopped, and the limb lay powerless by its side; the face movements continued only a few minutes after the arm became quiet, when the side of the face was observed to be paralyzed. While the right-sided convulsive seizure was going on, the left arm and leg were affected with choreic movements, which subsided soon after right-sided paralysis was manifest. Two hours after the first appearance of the spasm, I noted the following condition: Ptosis of right eye; no change in pupils, and no disturbance in movements of eye-balls. When he cried the right side of the forehead remained smooth, while the left was markedly corrugated; no paralysis of tongue, but complete *aphasia*. I was unable to investigate the special senses on account of the age of the child. Motion in the right arm and leg was completely paralyzed, sensation partially. He was conscious, and drank water with very little difficulty. The left side of the body showed no disturbance of sensation or motion, excepting occasional choreic twitching. The dread the child had of strangers prevented me from examining the heart. Temperature, 101; pulse, 120; respiration, 20; and very irregular. Some bronchial catarrh.

Second day. Temperature, 102; pulse, 130; respiration, 40. Had no vomiting; intelligence remained good; tongue dry; passed water and feces involuntary. During the next six days his fever remained high, cough increased, and evidences of catarrhal pneumonia developed.

About the ninth day the mother called my attention to a bulging of the right side of the chest, resembling the deformity produced by a large pleuritic effusion, with a marked lateral curvature of the spine, the convexity being toward the right side; percussion of the lung of this side elicited hyper-resonance and auscultation, normal breathing with prolonged expiration. The chest deformity was apparently due to contraction of the muscles

of the left side. He had conjunctivitis of right eye and dribbling of saliva from the right-angle of the mouth. Was very irritable, and often carried his hand to his head and moaned. Urine examined and found normal. The choreic movements of left side returned, but was not as marked as at first.

In the second week the muscles of the face began to regain power.

In the third week there was no marked changes in his condition, except a peculiar swelling and tenseness of the paralyzed leg, which persisted four days, and suddenly disappeared during one night; the next morning the leg was very flabby. Electromuscular contractibility was fair. In the latter part of the third week his head was drawn to the paralyzed side, the chin pointing to the left, showing the peculiar influence of the healthy sternomastoid, and other neck muscles, which was pointed out to me by Dr. Eskridge. The muscles of the right side of the neck were flabby; those of the left side were hard and tense. Lifting the head would place it erect, but when unsupported, would fall into its former position. In the fourth week movements were noticed in the arm, and in the fifth week the leg began to regain power. He was now, for the first time, using a few monosyllables, as "ma," "pa," etc.

In the fourth month he walked fairly; used a few more words, especially the simpler ones.

In the sixth month of his disease, his general health was good, and he was talking more, but only using such familiar words as children learning to speak usually employ. His gait was fair and and he was able to run, but there existed a marked weakness of the flexor and extensor muscles of the anterior part of the right leg and of the extensor muscles of the right arm.

I look upon the case as one of embolism of the left middle cerebral artery, obstructing the first branch, called the frontal-external and inferior, which supplies the third frontal convolution (convolution of Broca) wherein resides the centre of speech; also the second and third branches, called respectively the anterior parietal of Duret, or the artery of the ascending frontal convolution of Charcot, and the posterior parietal artery, or the artery of the ascending parietal convolution of Charcot. These two latter branches supply the motor centres of the extremities (Ferrier). The fourth branch, which supplies the angular gyrus, was proba-

bly not obstructed, as vision remained apparently unimpaired.

The motor centre of the facial muscles occupies a region in close proximity to those of the extremities, which is also supplied by branches of the middle cerebral artery.

There are some marked peculiarities in the case.

First. The age of the patient, two years and four months. Second. There was no loss of consciousness, which Hamilton says is the exception. In most cases there is either partial or complete loss of consciousness. Third. The disturbance of conformity of the chest, on the ninth day after the spasm. Fourth. The falling of the head to the paralyzed side twenty days after the spasm. Whenever he had a good night's rest, he was able to hold his head erect for two hours; after that time it lay to one side.

The order of recovery of the paralyzed parts was as follows: First, it is well to recall that the lower extremity lost power first, next the upper extremity, then the face, and later the neck and chest. In order of recovery, the face, neck and chest showed the first signs simultaneously, then the upper extremity, and next the lower extremity. When considerable power had been regained, quite noticeable yet was the weakness of the extensor muscles of the forearm, which gave the hand the peculiar position that resembles the wrist drop of lead palsy.

Most interesting of all was the occurrence of aphasia. Here was an active little boy, twenty-eight months old, who talked connectedly and as well as usual for one of his age, is suddenly stricken with unilateral spasm, followed by hemiplegia and total loss of the power of speech. His intelligence did not wane one whit during the whole trouble. When thirsty he protruded his tongue against the upper lip. If the parents told him the doctor was coming, he immediately manifested great fear, and beckoned for his mother to come near him.

If he wanted some article in a distant corner of the room, he pointed his finger at it and began to whine. When they put their hands on the wrong article, he intensified his whine, by which they understood it was not what he wanted. As soon as they touched the desired object, a smile came over his countenance.

In the fifth week he spoke his first words, as "pa," "ma," and "no." Later, other simple words were added to his vocabulary. The mother, a woman of experience, having had eight children, made a remark which struck me very forcibly, that it seemed as if he had to learn to talk over again. At no time did he misapply a word, as calling a "chair" a "table." When once he knew a word and its application, he always used it afterward. At this date (nine months after the attack) his speech is disconnected. If he desires to express a thought, he can make a good beginning, but is unable to finish. For instance; he wants to use the sentence, "Katie, get my hat in the other room!" he can only say, "Katie, get my hat ———," for the rest of the sentence he uses signs. His being unable to finish a sentence is not that he did not know the word "room," for when used otherwise, he had no trouble in recalling it. When he used three or four words in succession, his speech powers seemed at an end.

The discussion on Dr. Ott's paper was opened by Dr. Francis Dercum, who said he was inclined to regard the interesting case reported by Dr. Ott, as more likely to be one of hemorrhage than of embolism. It is well known that the miliary aneurism described by Charcot and others, occur sometimes in the very young, therefore, one of the conditions which leads to hemorrhage may be present in infancy. The absence of valvular disease of the heart was also against the idea of embolism.

Dr. Dercum thought that the symptoms presented by the case indicated a lesion of the internal capsule and basal ganglia, rather than of the convolutions. He referred to the more frequent occurrence of hemorrhage in this region, and also of the wide extent of cortex that would have been required to be involved in order to explain the phenomena.

Dr. CHARLES K. MILLS agreed with Dr. Dercum that, from the history of the case, the absence of recognized heart lesions, and the age of the patient, the case was probably one of hemorrhage. He believed, however, that some of the facts indicated a cortical lesion. One of these was the existence of choreic movements on the side opposite that which was paralyzed.

According to Duret, when irritative lesions of the cortex occur, they produce not only spasm on the opposite side of the body, but also may cause contraction or spasm on the same side, the result being brought about through irritation of the sensory nerves of the dura mater, which irritation is conveyed to the bulbo-medullary centres.

Dr. MILLS referred to the completeness of the paralysis, as a matter of great interest in connection with the views of Brodbent as to the communication by well-worn commissural channels of those parts of the central nervous system which preside over movements of the two sides of the body which are associated.

Dr. JAMES HENDRIE LLOYD referred to the remarks which Dr. Ott had made about the angular gyrus not having been involved, and said he was not aware that any well reported cases of embolism affecting the angular gyrus and causing blindness had been published.

Dr. DERCUM said that the occurrence of choreic movement on the side of the lesion could be as well explained by the transmission of irritation by means of the commissural channels of the brain, as by the views of Duret.

Dr. OTT closed the discussion, and said in favor of embolism is the sudden appearance of the attack, and an array of symptoms which usually follow an embolus in the left middle cerebral artery. In favor of cerebral hemorrhage is the disorganized condition of the blood as a resultant of measles, predisposing to such an occurrence.

On the conclusion of the discussion of Dr. Ott's paper, Dr. Charles K. Mills read a "Note on the use of nerve-pressure for the relief of hysterical contracture."

In three cases Dr. Mills had resorted to strong pressure, applied, by means of the thumb or fingers, to the trunk of the nerve supplying the muscles affected by the spasm in contracture; in a case of hysterical spasmodic torticollis, and in one of hysterical contracture of the wrist and hand, the condition passed away, and remained relieved; in a case of long standing contracture at the knees under the effects of pressure on the sciatics the spasm disappeared but recurred. The procedure was simple, and had value, both as a means of diagnosis and treatment. Whether the

effect was produced by mental effect, by causing a temporary paresis, or by the pain, he was not prepared to say.

Dr. WHARTON SINKLER spoke of having used the method unsuccessfully in a case of facial spasm, which was not, however, hysterical in character.

A stated meeting of the Society was held Monday evening, March 24, the President, Dr. S. WEIR MITCHELL, in the chair. Dr. Mitchell made some introductory remarks as follows, on "The Objects and Duties of a Neurological Society": I learned but four days ago that I must meet you to-night, for the first time, as your presiding officer. I thank you for the selection, with feelings which are not altogether made up of pure gratitude.

The time will come, I hope, to all of you when you will be so weighted with professional cares that the prospect of even an agreeable duty will appear to you as this one does to-night to me; for while it must be a pleasure to preside over a set of thoughtful men, united by the bonds of a common sympathy, the fact that this involves new duties is one from which I cannot escape. I shall begin by saying that this year especially I shall be absent often and for long periods from your meetings, and I have so stated before consenting to serve with and for you.

My own view of the duties of a president involves much more than merely to preside at meetings. He may do much by exciting and guiding debate, by arranging to secure papers, and by urging and, in a measure, influencing research.

He also has certain duties as a critic, and as critical duties are most pleasantly fulfilled when there is as yet nothing to criticise, I shall begin mine by saying briefly what I think this Society ought to be, what its individual members should seek to become, and what they ought to avoid being.

This brings up a question as to why medical men organize societies or join them. When there were no journals these meetings had an obvious purpose in the needful relations they established. They were to knowledge what the old exchanges were as regarded commerce. But now we have every new thing thrust at us in weeklies which we

scarce find time to skim. What, then, is the need for societies? Except, as in the case of our College of Physicians, they cannot sustain libraries, or act on public opinion, or nourish pleasant fellowship. If they have a real reason for existence, it is in the fact that they bring together in groups men having common interests, so that these men stimulate one another by example and criticism, and by the sympathy arising out of unity of pursuit.

It is never very well to be absolutely isolated in your pursuits. I, myself, can well recall how little interest I found in this city in physiology when I first began to work at it practically. It was a real and serious discouragement. The reverse of this condition of intellectual loneliness has its use. All men do more and better work amidst the competitions of other workers. Some men can do no work unstirred by the ferment of companionship in like efforts.

In these subtle agencies lie the value of associations like ours—in the examples they offer, the discipline they teach, the criticism they afford, the sympathy they evolve. The advantage of small societies is that they secure definiteness of aim, and that we hear only what interests all who are present.

The danger of such bodies is that of narrowness, and is the risk to which all persons pursuing specialties are themselves liable. It is to be avoided by not limiting your thoughts to what you discuss in this hall, and by keeping up that sympathetic wide-awakefulness which should preserve for you an interest, and a watchful one, concerning the work done in all other lines of professional progress. Neurologists are least of all liable to fail in this direction; their special study is too broad, and their exposure to this form of degeneration only comparative. It is the small specialties which suffer most, and for that reason I would allow no one to practice otology or ophthalmology alone who had not had ten years of general practice. Nearly every one in such a society as this should be capable of entering debate with something worth contributing; whilst in large collections of men a few members only debate a subject, and it may chance to have no relation to the active, practical life of the mass of those present. We shall hope,

then, to see here enough of debate, unsparing yet courteous criticism, a desire to talk only when there is something to say, and a highly cultivated tendency to sit down when that thing has been said. The habit of repetition, of unthoughtful comment and unfruitful criticism, shall have no place here.

Let me say a word as to papers. No doubt we shall, in our existence as a society, hear some papers which, to use an Irish phrase, would have been more interesting if they had never come into being. As to these future, and, therefore, defenceless victims, of unjust attack, a word in advance. When a man presents an essay here or elsewhere he should remember that, for a time, he has a group of people at his mercy, tied to the stake of patience by the bonds of social courtesies. It is his duty to have something to say, and then to say it as briefly as possible. There is no literary praise for one ought to value like that of condensation. When it is not possible to make brief reports as to cases, it is advisable, for society purposes, to cut them short by reasonable omissions.

Single cases, or those with clinical personal illustrations, are more desirable here than in larger societies, but I am apt to think little of the future of young men who are in the habit of reporting single cases. Let us have these only when they possess real value, or are unusual enough to evoke fresh thought and discussion. The patience which selects a subject and for years works at it, waiting for cases, and maturely considering them, seems to be rare in this country, despite of the sure rewards which await its labor. Let us hope to welcome here many such contributions.

Especially may I hope to see and hear much of therapeutics. In the numberless queries for debate at the International Medical Association at Copenhagen I saw not one therapeutic question, and there is a strong feeling in America that in England and this country therapeutics are more sincerely studied and more constantly kept in view by the best physicians than in Germany and France. This is possibly true, and may be owing to the growth of doubt engendered by the certainties of purely scientific work in regard to the insecurity of therapeutic decisions. It is too

true that direct therapeutics often owe little to the great masters in neural research; but it is not always true, and from some of the most scientific the art of healing has gained directly, as well as indirectly, through improvements in diagnosis, much that is of priceless value.

Here we must never cease to remember that our ultimate object is to relieve from pain and disability, and to save from death. Let us, therefore, keep constantly in view this matter of therapeutics. Let us see all new instruments, consider new drugs, receive hints from our laboratories, and perhaps have deliberate debates or conferences given over to some single agent, or to the treatment of some one disease, with the sharpest criticism upon supposed results.

As an example, I would like well to learn whether all of you accept the present views of the value of strychnia and the theory of its action, and to hear your evidence thereon.

Not less would I like such a conference with some surgeons added on the value of ovariectomy as a therapeutic measure in insanity. I mention these as illustrations; but your ideas as to exclusive diets in nervous maladies would be as interesting.

Regarding you as a set of men grouped for a certain kind of work, something more may be said.

You ought to appoint committees now and then to collect material and suggest work, or to deal with certain questions, such as the best means of determining the amount of sensation present in a part. As to this, there are, except Weber's plan, which fails of value save for slight cases, no generally adopted and trustworthy methods. In the same direction there is good work to be done by collective labor in determining, through the effect of nerve sections, the true distribution of nerves to the skin. I might easily multiply such questions; and some of them would have a peculiar value relative to climate and seasons in America; and of these would be the relation of rheumatism to chorea, and the statistics of cerebral apoplexy relative to temperature.

It does not seem to me that it will be ever wise to attempt separate publication of proceedings. If there be any surplus of money it may go toward aiding laboratory work, or

to completing for our college library its very imperfect collection of books on neural maladies.

With these hints and with my renewed thanks, I enter with you upon your society life, in the hope that it may be long, vigorous, and interesting.

Dr. Sinkler presented a patient suffering from spinal accessory spasm, and read the following history of the case:

Anna B. K., aged forty-one years, single. Has never enjoyed very good health, but has had no special illness. She has had neuralgic headaches for several years, and about three years ago had rheumatism in the left shoulder. In the spring of 1882 she noticed that, while sitting sewing, her head would turn toward the right shoulder. She could control the movement at first, if she directed her attention to it, but it soon began to be worse, and less under the influence of the will. In June or July, 1882, she became unable to restrain the movements of her head. There was no pain in the neck or head, but she became nervous and irritable. There was a sense of discomfort on the top of her head. The use of her eyes seemed to make the movements more troublesome. Her general health had been fairly good; the appetite poor, and she has worried greatly. She was under Dr. Sinkler's care, at the Infirmary for Nervous Diseases, for several weeks in the spring of 1883, and various remedies were used. Galvanism and static electricity were faithfully applied, as well as massage. Hypodermics of atropia were given in the muscle affected, and the bromides and gelsemium were administered. There was no benefit apparent from the treatment.

The patient was re-admitted to the Hospital a few days ago, and her present condition is as follows: She is thin and of spare build. She usually sits resting the right side of the face against her hand to check the movements. The head is rotated to the right every few seconds, and turns more frequently if she is excited or nervous. The chin is turned strongly to the right and the head inclined slightly in the same direction. The head is not drawn back. After being held in this position for about two seconds the spasm relaxes and the head becomes straight. She can keep the head quiet by resting it against some object, and sometimes will rest her head against the wall, for this purpose. The left sterno-cleido mastoid muscle is markedly hypertrophied and is tender to handle. Pressure over the spinal accessory nerve does not arrest the spasm; it rather brings it on. There is pain

at the insertion of the right sterno-mastoid muscle, but none in the left muscle. No contraction takes place in the trapezius muscle and it is not hypertrophied. The voice is unchanged and there is no laryngeal spasm.

The urine contains neither albumen nor sugar.

Dr. HARLAN, one of the surgeons at Wills Eye Hospital, kindly examined the patient's eyes, and reported that optic discs were nearly or quite normal. Vision R. $\frac{20}{30}$, L. $\frac{20}{40}$.

The patient is nervous and inclined to be hysterical.

Dr. DERCUM mentioned a case which was relieved by nitrite of amyl. He said, however, that the case was specific in nature. Iodide of potassium was afterward given, with satisfactory results.

Dr. MITCHELL believed that gelsemium, in exceedingly large doses, was the best remedy for such cases.

Dr. A. J. PARKER made some remarks on *the primitive fissures of the fetal brain*. These fissures appear very early in foetal life. He did not believe, with some, that they were due to hardening agents, as alcohol and chloride of zinc. He found that these fissures had certain mathematical relations to the brain itself. He regarded them as due to pressure, just as brain flexure is due to pressure. The brain grows under pressure; it tends to grow more rapidly than the skull. Fissures represent retarded growth.

The PRESIDENT invited Dr. Guy Hinsdale to exhibit to the Society some mounted specimens showing the lesions of snake venom.

The specimens were obtained in the experimental laboratory of Drs. Mitchell and Reichert, in the University of Pennsylvania, and illustrated the ecchymoses seen in the lungs of rabbits into whose jugular veins venom had been injected. The appearances are striking, the blotches of extravasation being in marked contrast with the surrounding lung tissue. The colors have been preserved by filling the large cells with a fluid composed as follows:

Glycerine	Oss.
Dense sol'n gum-arabic	Oj.
Sat'd sol'n acetate of potash	Oiss.

The cells are made by cementing to a square piece of plate-glass a rubber ring, five inches high and five broad, covering the cell, when filled with the fluid, with a round cover-glass. These cells are four inches in diameter. The cement used is known as "Van Stan's Stratena," and, being made with acetic acid, is not affected by the fluid of the cell. Before the rubber ring is fastened to the glass a triangular cork is cut in it at two places, so that if the fluid becomes discolored, as in mounting specimens too quickly, the original fluid may be drained away and fresh fluid supplied. Large hypodermic needles and a syringe are of use in this operation. Air-bubbles may also be removed in this way. The specimens exhibited have been mounted for only one month, but they are apparently as fresh as ever.

The eight specimens exhibited the lesions of pure venom of the rattlesnake, the lesions of the three globulins, and the peptone which compose the poison.

Reviews and Bibliographical Notices.

Influence of the Mind on the Body. By D. HACK TUKE, M.D. Philadelphia: H. C. Lea's Son & Co., 1884. Second edition.

Bulwer in his "Strange Story" makes one of his characters, a physician, use the following language, which contains one of the central ideas suggested by the present work: "Fellow-creatures, afflicted by maladies your pharmacopœia had failed to cure, came to me for relief, and they found it. 'The effect of the imagination,' you say. What matters, if I directed the imagination to cure." It is interesting to trace the flux and reflux of medical opinion on this subject. When the late Dr. G. M. Beard brought the present topic before the American Neurological Association in 1876,¹ Dr. Hammond remarked that if the doctrine of Dr. Beard was to be accepted, he would feel like throwing away his diploma and joining the theologians. Dr. Webber believed that Dr. Beard approached very close to the border line between truth and deception. Dr. Mason objected to the term mental therapeutics, and denied its existence. Dr. Putnam had never seen instances of cure where actual disease existed. In 1877,² however, the view taken by the Association was somewhat different, Dr. Seguin taking the ground that there was no trickery in the use of emotion to this end, and the general tone of the discussion rather favored Dr. Beard's position.

Dr. Tuke states that the objects of the present work are: "First, to collect together in one volume authentic illustrations of the influence of the mind upon the body scattered through various medical and other works, however familiar to many these cases may be," supplementing them by cases falling within his own

¹ JOURNAL OF NERVOUS AND MENTAL DISEASE, 1876, p. 41.

² *Ibid*, 1877.

knowledge. Second, to give these cases fresh interest and value by arranging them on a definite physiological basis. Third, to show the power and extent of this influence, not only in causing disorders of sensation, motion, and the organic functions, but also its importance as a *practical* remedy in disease. Fourth, to ascertain, as far as possible, the channels through and the mode by which this influence is exerted. Fifth, to elucidate by this enquiry the nature and action of what is usually understood as the imagination. From this it is obvious that Dr. Tuke covers more extendedly and thoroughly the ground of this subject, in the study of which he preceded Dr. Beard for at least four years. The first edition of the present work was of value from the fact that it tended to induce systematic observations on topics hitherto regarded as curious rather than "practical." The mind in the introduction is said to act on the body through its threefold states of intellect, emotion, and volition, and these three states correspond to the main divisions of the book. Dr. Tuke in Part I gives valuable and interesting résumé of the older literature pertaining to this subject. It appears from this that certain principles regarding the influence of mental states in the production of physiological changes were recognized by Unger in 1771 and were lectured on by John Hunter in 1786-7. In this connection it may also be stated that Rush, whom nothing escaped, had made observations in this field. Certain remarks of Rush in regard to the study of medicine are considered by Dr. Tuke so pertinent to the present subject that he quotes them with approval: "Remember how many of our useful remedies have been discovered by quacks. Do not be afraid therefore of conversing with them and profiting by their ignorance and temerity. Medicine has its Pharisees as well as religion; but the spirit of this sect is as unfriendly to the advancement of medicine as it is to Christian charity." These words of Dr. Rush, one of the greatest geniuses America has produced, are well worthy of comparison with the course adopted by the English medical profession toward Dr. Elliotson, who was treated in a way that is an eternal disgrace to the regular profession, all because he endeavored to study hypnotism and allied topics from a scientific standpoint.

The chapter on general psychological and physiological principles is written in an interesting and not too profound style. In the second chapter the influence of the intellect on sensation is discussed. In this chapter instances and the *modus operandi* of

the psychical production of æsthesia, hyperæsthesia, anæsthesia, dysæsthesia, and paræsthesia are given. Under the head of anæsthesia reference is made to the fact that the brutal prejudices of certain English surgeons led them to oppose the use of ether and other anæsthetics in surgery. Dr. Tuke concludes respecting the influence of the intellect on sensation : First, when ideas arise from the sensorial perception of impressions upon the peripheral terminations of the various classes of nerves, they may react upon the sensory centres, and influence general, special, organic and muscular sensations, causing sensational illusion. Second, when, through intellectual operations, ideas are imagined or recalled, these may be merely ideational states, but they ever tend to become identical in character, though not necessarily in degree, with the complex states formed where peripheral sensations first excited them. One recurrence therefore of the ideational states, coöperating with the sensory centres, usually recalls, also, although but faintly, the sensation corresponding to the idea. Third. In some conditions of the brain, the sensory centres may be so powerfully excited, that the effect is identical in sensory force (in objectivity) with that which results from an impression produced upon the peripheral terminations of the nerves, causing hallucinations or phantasmata. Fourth. The mind under certain circumstances can, by attention, recall the sensorial impression so distinctly as to produce, *e. g.*, in the case of sight the spectrum or image which was impressed on the retina and procured by the sensorium. Fifth. Not only may hyperæsthesia be produced, but complete anæsthesia be caused by the actions of the intellect. The remaining chapters contain similar instances of clear analysis and the leading ideas are condensed into conclusions. In the discussion of the influence of the emotions on the organic functions, the question of the change of hair color from nervous shock is alluded to. In the section on the influence of mental states of emotion upon disorders of the involuntary muscles, the influence in the cure of gout is well shown. This was known to Sir W. Watson, who cited a case where fright cured gout. Dyce Duckworth's recent observations point out the reason for this psychical influence on, what is according to him, a nervous disease. The influence of mental states in the modification of phthisis is not as well illustrated from Dr. Tuke's own experience as one would expect. It is of interest in this connection to remember that Superintendent of the Bloomingdale Asylum wrote in 1829 concerning Guiteau's uncle who died in that institution, that as in

most hereditary lunatics phthisis ran a very irregular course ; being checked when the mental disorder was at its height. In discussing the influence of the Royal touch, Dr. Tuke has overlooked the case of the patient, touched very unwillingly by William III., who was cured notwithstanding that clear-headed monarch's disbelief in what he regarded as a silly superstition.

Dr. Tuke concludes : First, the influence of the mind on the body shown to operate powerfully in health is at least as powerful in disease, and may be highly beneficial in aiding the *vis medicatrix* and opposing the *vis vitiatrice naturæ*. Its action may be gradual or sudden, as in the shock of a railroad accident. Second, this truth is by no means confined, as it is often supposed to be, to nervous disorders, but extends to other diseases. Third, this principle may be carried out in a general way by calming the mind : When the body suffers from its excitement, by arousing the feelings of hope, joy, and faith ; by suggesting motives for exertion ; by inducing regular mental work, especially composition ; by giving the most favorable prognosis consistent with truth ; by diverting the patient's thoughts from his malady, and thus, in these and other ways, influencing beneficially the functions of organic life through the mind. Fourth, the influence of the will upon disease, apart from voluntary attention, is a very important agent in psychotherapeutics. Fifth, the effects accidentally produced upon the body by mental impressions, in disease, can be imitated, and the arts used by the empiric divested of their non-essentials, and systematically utilized. * * *

The book is interestingly written in a chatty style. One possible danger may be induced from Dr. Tuke's ignoring the serious consequences that at times result from hypnotism. The book comes up bibliographically to the usual standard of the Leas'.

J. G. KIERNAN.

Transactions of the Pennsylvania State Medical Society. Vol. xiv. Philadelphia. Times Printing Office. 1882.

This is the volume of the "Pennsylvania State Medical Society Transactions for 1882," which has up to this accidentally escaped review. In the last number of the JOURNAL the "Transactions for 1883" were briefly reviewed, and the review of the present volume should have preceded that review. The first paper coming within the JOURNAL's scope is the address on "Mental Disorders," by Dr. Chas. K. Mills, which has a sub-title : "Reflections on Criminal Lunacy, with Remarks on the Case of Guiteau." The

article is pervaded with a decidedly scientific spirit. Dr. Mills treats the subject of criminality from a purely scientific standpoint, biased a little by the impure researches of Benedikt, Parker, Osler, and other dilettante psychiatrists. He, however, exhibits a broadness in his views which prevents the present address from being too much tainted by the hasty conclusions of the gentlemen cited. Dr. Mills, in speaking of the question of responsibility, says: "Could he help committing the crime? is the crucial question." In his discussion of the case of Guiteau, Dr. Mills gives a very good *résumé* of the opinions of experts on both sides of the case. He uttered the prophecy, which subsequent events verified: "If, as seems probable, Guiteau should go to the gallows with the air of a hero and martyr, his example, instead of deterring, will be more likely to invite, other insane criminals to deeds of violence and blood." Dr. Mills denounces, and with justice, the "spirit of caution which borders almost on pusillanimity" that has been engendered by the stand taken by asinine judges against reputable physicians in *habeas corpus* cases. Dilettante and dishonest experts are more responsible for this state of things than even the political judges. Dr. Mills also pleads very strongly for a hospital for insane criminals,—something which every large State should have in justice to the non-criminal insane. The address, as a whole, is permeated by a catholic scientific spirit. Dr. Mills, misled by erroneous reports, cites Dr. Beard in one instance as Dr. "Barry."

Dr. Schultz, Medical Superintendent of the Hospital for the Insane at Danville, read a paper on Gheel, at this meeting of the Pennsylvania State Medical Society. The paper is permeated by a bias derived from the writer's preconceived ideas. In his remarks on the price paid for the maintenance of the insane, Dr. Schultz ignores the purchasing value of money. Money has, strange as it may seem to Dr. Schultz, a relative, not an absolute value. To the reviewer's knowledge, board and washing could be had in certain retired districts of New Hampshire, in 1867, for \$10 per month. Certainly, considering the surroundings of Gheel, \$1 must be a very large amount in the estimation of the peasantry. Dr. Schultz also ignores that the special value of treatment in psychiatry is to introduce healthy ideas into minds incapable of originating these for themselves. A population which has dealt with the insane for centuries must have acquired, like attendants in hospitals for the insane, some knowledge of management, and hence some knowledge of how to train the insane. Illegitimate

pregnancies have rarely occurred in Gheel, and by American doctrinaires the few instances are boldly exhibited as evil effects of the Gheel system. Of the illegitimate pregnancies occurring at the Hospital for the Insane at Harrisburgh, at the State Emigrant Hospital for the Insane, Ward's Island, and at the State Homœopathic Asylum at Middletown, New York, nothing is said. The *possible* cruelties at Gheel are descanted on at length; the *actual* cruelties and oversights in the Virginia, Utah, and Kentucky asylums are kept in the background. The present reviewer believes that the vast majority of the insane can be best treated in a properly conducted hospital for the insane, but he thinks that the Scotch colony at Kennoway, and Gheel, if they are to be studied at all, should be studied from a purely scientific standpoint. The article of Dr. Schultz views Gheel not from the standpoint of a scientist who takes all the circumstances into consideration, but from the standpoint of one who is unable to rid his mind of preconceived ideas. A very good idea of Gheel may be obtained by combining the picture drawn by Dr. Schultz, and that drawn by Dr. Morton. The transactions are very fair specimens of bibliographical work.

J. G. KIERNAN.

Hydroelectrische Bäder. Kritisch und experimentell auf Grund eigener Untersuchungen bearbeitet. Von Prof. A. Eulenburg, in Berlin. Wien and Leipzig: Urban & Schwarzenberg, 1883.

This monograph of 102 pages, containing twelve wood-cuts and two plates, certainly treats the subject of hydro-electric baths from an entirely new and original standpoint. Since the year 1868, when Bouillon-Lagrange wrote his thesis upon hydro-electric baths, considerable literature has been added to the subject, but unfortunately all the authors, up to the present work, have endeavored to construct an edifice by commencing at the roof and building downward—never, however, reaching a foundation. They have all been very explicit in their description of the manner of application; their chapters on therapy have been extensive, the diseases cured by this means innumerable, but the physiological action of the various currents, under these new conditions, has until now received but little or no attention. As a direct consequence of this superficial mode of treating a scientific subject, these “hydro-electric,” or as they have been commonly called “electric, baths” have fallen from the domain of science to that of charlatanism,

and have been, so to say, monopolized by men who dispensed them for the sole purpose of pecuniary gain, and without the slightest scientific interest. Naturally the baths fell into disrepute. Eulenburg has now, in the book before us, studied the subject from an experimental physiological point of view, and has endeavored to learn how the electric currents act upon the human body when applied by means of the bath.

The first few pages of the monograph are devoted to an historical review of the subject. The experimental part is commenced by investigations of the current intensity, diffusion, and strength. The resistance of the bath fluid itself, and then that of the human body in and out of water, is studied.

The results obtained as regards the resistance of the bath fluid itself are such as we would *a priori* be led to expect.

In regard to the resistance of the human body, the author finds it to vary from 20,000 to 3,000 S. E. This very high resistance of 20,000 S. E. was obtained by the use of dry electrodes, a thoroughly unscientific procedure, as the result obtained is not the resistance of the body alone, but the resistance of the body plus that of the dry electrodes, which is necessarily very great. Neither is the size of the electrodes, nor the amount of pressure used in their application, two important factors in measurement, taken into consideration. Eulenburg also claims that the resistance of the body while in the bath gradually increases during the passage of the current. This fact is so diametrically opposed to what we have been accustomed to find out of the bath, that we think the decreased angle of divergence of the galvanometer needle in E.'s experiments was probably due to secondary currents in the bath itself, thus increasing the resistance, or to polarization in the battery. That the question of current diffusion or current density has not been elucidated Eulenburg admits himself. In the construction and use of the hydro-electric baths he separates distinctly the two ideas of general and local electrization by this means, and justly condemns those authors who have advocated them as a means of local treatment. Two forms of bath apparatus are described, the monopolar and the dipolar. The monopolar has one pole only immersed in the fluid—if the tub is metallic it may itself constitute this pole; the second pole is then placed upon any part of the body which is out of water. In the dipolar, both poles are immersed in water, and the body lies between them, without, however, coming into direct contact with either. This latter system is the one most in use in hydro-electric institutes.

The faradic bath is not neglected, but more attention is paid to the galvanic as presenting more points of scientific interest. In regard to the choice of a battery, the author recommends for the faradic bath a Bunsen battery. For the galvanic he recommends either an immersion Grenet, a Leclanché, or a gravity battery. It is surprising to see three batteries so different in principle recommended indiscriminately to fulfil one and the same purpose.

Upon page 39, where the author speaks of gradually increasing the strength of the current by "*increasing the number of cells or by introducing larger resistances*" into the circuit, he becomes unintelligible.

The author's experiments in reference to the physiological action of these baths are interesting. The results of his investigations concerning sensation and pain are unimportant. The heart's action is reduced. This is more marked in the galvanic than in the faradic bath.

The diminution in the frequency of the pulse persists for some time after removal from the bath. Respiration is but slightly affected. A number of experiments upon frogs are also detailed; these were made for the purpose of ascertaining the influence of the current upon motion. The author's idea in general is that these baths act almost identically with general electrization practised by other methods, but considers this mode of application as the most practical. The chapter on therapeutics is short but complete. The use of the bath is recommended for most all conditions in which general electrization has been found serviceable, also for some cases of certain neuralgic and convulsive affections and for certain vaso-motor trophic neuroses, and for neurotic affections of the skin. The author details a case of paralysis agitans in which the intense continuous tremor was palliated for hours by the use of these baths. There is in our mind no question but that any mineral bath which produces dermal irritation, may fulfil many of the indications which he lays down as requisite for the use of the hydro-electric bath, and that the majority of affections which are benefited by the use of the latter, will also receive benefit from the former.

A description of the construction of the baths and accessory apparatus, together with plates describing a hydro-electric institute, finishes the monograph. All in all the book presents points of great scientific interest and, although the results of many of the author's investigations are in some instances vague and incomplete, he has certainly laid a foundation for future work upon this subject which will be found invaluable. [G. W. J.]

The Character and Hallucinations of Joan of Arc. By W. W. IRELAND. Reprinted from the *Journal of Mental Science*, January and April, 1883.

Dr. Ireland gives in this a history of Joan of Arc's career, without deciding to pronounce positively, in the present article, on her mental condition. He seems to lay stress on the fact that her associates did not regard her as insane, but, considering the age in which she lived, such expert evidence could not be of much value. Certain peculiarities narrated point to the existence of paranoia (primary monomania), and if such be the case, the secondary production of Joan of Arc's hallucinations is accounted for. The style of Dr. Ireland is pleasing, and his psychological analysis of the case, which is promised for a later date, will be awaited with interest.

Testimony Taken before the Select Committee of the Senate, Appointed May 25, 1880, to Investigate Abuses Alleged to Exist in the Management of Insane Asylums, as well as to Inquire into the General Subject of Lunacy Administration in this State. Ordered to be printed April 5, 1882.

The report of the Senate Committee of 1880, on the insane asylums of New York, was presented in 1882, and noticed in this JOURNAL for April of that year. Our readers will remember that its criticism of asylum management was very positive, and that it urged some radical changes in the lunacy system of the State. To those who did not know with what pains and skill the whole subject of the care of the insane had been studied by the Committee, these recommendations probably seemed of doubtful value. But another period of two years has elapsed, and the entire testimony on which the report was based, forming a volume of 992 pages, is finally published. That it more than justifies the conclusions of the Committee cannot be denied. Its publication, moreover, at the present moment is most opportune. The testimony taken in a Legislative investigation of the Utica Asylum last year was "mis-laid" in the office of the public printer, and has not yet been printed. That which we have before us has doubtless been placed in the hands of the Assembly Committee now engaged in a third inquiry into the affairs of this asylum, and must prove a valuable guide to their labor. In view of the fact that the report of this last Committee may soon be expected, and that it promises to open a way to that reform in the asylums of

the State for which the JOURNAL has labored from its beginning, the present notice need not be made exhaustive.

The first duty of the Lunacy Commission recommended by the Senate Committee of 1880, in its report, was "to look after the interests of the State in the matter of expenditure." We are not, of course, to understand that the Committee considered the expenditure of a few thousand dollars, more or less, for the insane of the State, as of any importance compared with the question of their just and humane treatment. But it was plain to them that the love of public plunder might be the root of all kinds of evil in lunatic asylums as in other branches of civil service. The financial affairs of these institutions are, therefore, given an important place in their report.

As being the oldest in the State, and the model upon which all the other hospital-asylums, so-called, were organized, the Utica Asylum was that to which the inquiries of the Committee were mainly directed. The JOURNAL has more than once¹ called attention to the excessive expenditures of this asylum, and to their misrepresentation and concealment in its reports. Other journals have performed the same unwelcome task, and the *Medical Record*, six years ago,² called explicitly upon Dr. Gray to explain a systematic "cooking" of his accounts; the natural presumption being that this was done "to cover extravagance and recklessness of administration." Surely, if it were possible to meet these accusations, no better opportunity could be asked than was afforded by the Senate Committee. We regret to say that Dr. Gray's explanations are most unsatisfactory, and leave every thing still to be explained. On page 728 of the testimony is an extract from the report of the State Comptroller, under date of January 8, 1879, as follows: "Another case deserving criticism has been brought to light in one of the State institutions, which publishes a *Journal of Insanity*. This paper has been published for many years, and from an account rendered to this department, at my request, I learn that since 1850 its bills have been paid out of the funds of the institution to the amount of \$17,092.42. Up to 1856 the institution received from the paper \$670.53. Since 1856, or for twenty-two years, the treasurer reports no receipts from the paper, but says: 'I have understood and believe that they have been spent in editorial services, and the purchase of books for the asylum libraries.'" The Comptroller goes on to say that the

¹ Vol. ii., page 781; vol. iii., page 359; and vol. vii., page 357.

² Vol. xiii., No. 5, page 93.

amount of these receipts from the journal cannot be stated by the asylum treasurer, that he never sees the vouchers for their expenditure, and concludes: "It would be difficult to properly stigmatize such loose management."

On page 464 of the testimony Dr. Gray is examined by Senator Fowler in regard to the accounts of the *Journal of Insanity*, as follows:

"Q. The expense of publication is paid by the asylum?"

"A. Yes, sir; just as any other part of the expenditures of the asylum.

"Q. Out of what fund is this paid?"

"A. The bills are paid precisely as any bills are paid.

"Q. Out of the asylum funds?"

"A. Yes, and the avails paid into the asylum funds.

"Q. What income is derived from it?"

"A. An income that about meets the outgo."

And again, on page 504, Senator Woodin inquires of Dr. Gray:

"Q. You made an observation, in the early part of your examination, that the *Journal of Insanity*, published here, was self-supporting substantially?"

"A. Yes."

In reference to the "cooking" of the asylum accounts, we quote from the examination of Dr. H. B. Wilbur, by Senator Fowler, as follows:

"Q. You will observe by Dr. Gray's statement, if you will read it, that he gave an account of the value of the products of the farm, and the aggregate of the expenses for the management of it; showing a profit of in the neighborhood of \$7,000, I think?"

"A. I have the report here.

"Q. You observed that in his public testimony?"

"A. I observed that.

"Q. Well, have you made any examination of it—gone into an analysis of it to any extent?"

"A. I have.

"Q. Tell us the result.

"A. If the Committee will turn to page 44 of last year's report, to which Doctor Gray refers in his testimony, you will find there the statistics given of the productions of the farm, amounting to \$13,621.40. Now an analysis of that will show you that the real value of those productions is at least \$5,000 less than they are recorded. I will call the Committee's attention to two or three points, as an illustration. The beets, four thousand four

hundred and eighty bushels, are valued at forty cents per bushel, making \$1,792, which any agriculturist will testify do not cost over ten cents a bushel to raise ; and one of the leading agriculturists of the State told me yesterday that they had just inventoried their beets at twelve cents ; and, furthermore, they are not worth for conversion into milk more than twenty cents a bushel.

"Q. Do you mean to say they took beets, and fed them to their own stock ?

"A. Precisely, I will come to that in a minute. Then, under the head of 'carrots,' three hundred and fifty bushels at fifty cents. Twenty-five cents is as much as they are worth ; and so of almost every item on the list, the value is over-estimated. Then the next point is, they have given credit for the hay \$1,440, the beets \$1,792, the carrots \$175, and so on ; then they give credit for 126,000 quarts of milk at five cents, at least one half of which was the product of the hay, etc.

"Q. That is where the hay and beets went ?

"A. Yes, sir ; it is as if a woollen manufacturer in counting his assets should give credit for the cloth on hand, and the wool in the cloth. Is that clear to the Committee ?

"Q. I understand that.

"A. In reports of the Northampton Asylum in Massachusetts, the superintendent only gives credit for about one third of the milk. In other words, the grass-fed milk.

"Q. It is by that system that the value of the productions of the farm is over-estimated ?

"A. Over-estimated at least three or four thousand dollars. If the Committee will turn to the treasurer's report on page 14, they will find that on the debtor side (and there is a point to be noted), that that is for ten months. For the farm, barn, and grounds they expended \$6,355. They have the productions of the farm for the year, but the expenses of the barn, farm, and grounds for only ten months, which would increase that \$6,355 considerably.

"Q. One fifth ?

"A. One fifth. To that is to be added the labor of the men, which is included not in that, but under the other head of wages, \$34,592 ; included in that sum. There is about \$7,000 of wages to be added to this \$6,355, and which is given in the treasurer's report, showing that the farm is managed at a loss to the institution."

Upon this subject of the asylum accounts Dr. L. A. Tourtellot was examined by Senator Fowler, as follows :

"Q. Dr. Gray stated to the Committee the asylum had contributed \$100,000 or more to permanent improvements on that property—what the United States law called betterments. Do you know any thing about that—that it had been a paying institution to that extent—that the State realized \$100,000 profit on it, or more?

"A. I do not think that is true.

"Q. What do you know about it, and what light can you give us on that subject, if any?

"A. I have some memoranda on that subject; I cannot quite bring together my ideas now.

"Q. You have them with you?

"A. Yes, sir.

"Q. Will you furnish them as a part of your testimony.

"A. Yes, sir."

We have looked in vain through the appendix to the testimony for the above-mentioned memoranda. Can it be that they have been "mis-laid," as was the report of the Assembly Committee last year? There appears, however, in the report of Dr. Tourtellot's examination by that Committee, as published in the Utica newspapers, a statement of "False and Deceptive Accounts" of the asylum, which the witness testified to be substantially the same as that given by him to Senator Fowler. The following extract is important, in view of the evidence of Dr. Gray above quoted :

"On page 18 of the report of the Board of State Charities for 1868, Dr. Gray recognizes the item of 'farm, barn, garden, etc.' as current expenses, and compares it with the yearly value of the products of the farm and garden each year, for twenty-five years. [N. B.—In order to make the exhibit a favorable one, an important expense of the farm, *i. e.*, labor, is left out of the account.] On the next page, however, he adopts the contradictory and most extraordinary plan of representing the sum of these expenditures on 'farm, barn, garden, etc.' for twenty-six years, as 'payments for the purchase and improvement of land.' "

Certainly, if these expenses of farm, garden, etc. are properly compared with the value of farm and garden products each year, to show a gain or loss in farming operations, it is impossible to set down their sum for twenty-six years (\$111,796.24) either as "realized profit" or as a contribution "from the current receipts of the asylum for the purchase and improvement of land." Dr.

Wilbur shows clearly that when the over-estimated, and in some cases twice-estimated, value of farm products and the entire omission of the cost of labor on the farm and garden are taken into account, the asylum farm is worked at a yearly loss. It further appears in the statement of "False and Deceptive Accounts" referred to, that the current receipts of the asylum during the fifteen years ending with 1880 were more than a million dollars in excess of those of the model asylum at Northampton, Mass., for an equal number of patients. In addition to these receipts on account of maintenance, it is testified that Dr. Gray received nearly half a million dollars from the State treasury during the same period for "additions, alterations, and improvements," which are charged to the account of extraordinary expenses. Dr. Tourtellot also describes minutely the various expedients by which Dr. Gray has concealed an average amount of \$50,000 yearly in a false weekly cost per patient. The whole analysis is an astounding one, although it is only a more detailed statement and covering a longer term of years than those which have appeared in the pages of this JOURNAL.

While looking for this testimony, so mysteriously withheld from the published document, our attention has been called to another *hiatus* in the testimony of the same witness, which seems equally strange and suspicious. The questions are by Senator Fowler :

"Q. Doctor, do you know any thing of your own knowledge, or can you give us any information—put us on the track of any information—as to any misapplication of public funds or public property connected with the asylum—property belonging to the State, or funds belonging to the State ?

"A. I have yome memoranda of that sort.

"Q. With you ?

"A. Yes, sir.

"Q. That written statement which you will hand to the Committee will be a part of your evidence here, on this examination ?

"A. Yes, sir.

"Q. That statement which you will hand in is a correct statement ?

"A. Yes, sir.

"Q. Will that statement also include the scheme for supplying the asylum with water ?

"A. Yes, sir."

No further mention of this "written statement" of Dr. Tourtellot follows the above extract or is to be found in the appendix.

The particulars of the scheme referred to for supplying the asylum with water were, however, brought out by the Assembly Committee last year, and have been published since the report of that Committee was discovered, after a protracted search, in the office of the public printer. They are as follows :

" In 1866, Dr. Gray and a partner bought sixty acres of land near the city of Utica for \$24,000. The greater part of this was farm land, with a prospective value for city lots, but some nine or ten acres, through which the Chenango canal passed, were a swamp, giving rise to the stream from which the Globe woollen mills drew its water supply. Soon afterward Dr. Gray offered to sell this swamp land to the mills for \$24,000 dollars. This offer was made to Mr. A. C. Miller, the counsel of the mills, who had previously been offered by Dr. Gray a place as manager on the asylum board. Both offers were refused, and in the autumn of 1867 Dr. Gray proposed to Judge Denio, then a manager, the purchase of the swamp by the asylum for a water supply. The proposition was at once condemned by Judge Denio as illegal and dishonest. Nevertheless, in the spring of 1868, a meeting of the Board, of which Judge Denio failed to receive notice, was held ; the scheme of Dr. Gray was sanctioned ; and, in due time, Dr. Gray or his partner received from the State about \$17,000 for nine acres of nearly worthless swamp, on the award of three well-known members of the canal and capitol rings."

Another portion of these memoranda touching " the misappropriation of public funds," is published with the above, as follows :

" Charges, the most serious of which was one of speculation, were laid before the managers in 1868, by Dr. George Cook, of Canandaigua, and a prompt and thorough investigation promised. The inquiry which followed was formally conducted by the president of the board, but was, in fact, directed by Dr. Gray in person. Dr. Cook was not present, not having been invited, and the efforts of the majority of the board to suppress all facts unfavorable to Dr. Gray were undisguised. Only a few witnesses were sworn, and nearly all were employés of the asylum, who were impressed with the belief that they would accuse Dr. Gray at their peril. Dr. Gray was acquitted, but Dr. Cook was not satisfied, and brought his charges before the Assembly of 1869, of which he was a member. A resolution offered by him for an investigation was, however, defeated, and a joint committee of the Senate and Assembly appointed for the purpose. This committee, the most important member of which was Senator Tweed, and from which

Dr. Cook was excluded, made a visit of a few hours' length to the asylum, where they listened to such portions of the minutes of the managers' investigation as was thought best to read to them, and afterward sat down to a sumptuous repast. The investigation was at an end.

"For upward of eight years before the charges of Dr. Cook were made, Dr. Gray had been in the habit of sending to do work on his private houses and farm the carpenter, plumber, engineer, painter, and other skilled employés of the asylum, and also the farmer, farm laborers, attendants, and patients. He had also been accustomed to direct the transfer of materials belonging to the asylum, such as lumber, paints, gas-pipe, etc., to his private premises for his own use. At times only a few of the asylum employés and patients were sent to work on the property of Dr. Gray. Again forty or fifty of them would be so employed at once. Usually the time of those so employed was kept by the engineer or the farmer, for the pretended purpose of calculating the value of their services, so that Dr. Gray might pay the asylum for the same. This was well understood, however, to be a mere blind, and it was so proved by testimony taken by Judge Denio, one of the managers, as appears from his minutes of the investigation, so-called, of Dr. Cook's charges, in these words :

" 'Walter Button, plumber and gas-fitter of the asylum, began to do work for Dr. Gray on his houses about the year 1858, and had done such work almost every year for about ten years. One job, done by himself and another employé, was two weeks long. Sometimes he kept an account of the time thus employed, and sometimes not. These accounts were handed in to Mr. Graham, engineer of the asylum. He (Button) was always paid by the asylum for all his time, including that when he worked for Dr. Gray. Dr. Gray had never paid him for any work done on his houses.

" 'H. N. Dryer, steward of the asylum, testified that Dr. Gray had never paid the asylum any thing for Button's labor, nor anything at any time, for the labor of any of the asylum employés on his houses or land, except the sum of twenty-six dollars, paid to George Sheldon on his leaving the asylum to enter the service of Dr. Cook.

" 'The testimony of these witnesses was not shaken by a cross-examination by Dr. Gray, and was not contradicted.' "

To Dr. Gray's testimony is added a written statement, in contradiction of the memoranda of Dr. Tourtellot, which were already

before the Committee. But nothing of what we have quoted is contradicted or denied, except in the declaration that the witness "never had any thing to do with the finances either of the *Journal of Insanity* or of the institution." Why this feeble denial of testimony based on his own reports, and what the secret of the omission of this testimony from the printed document, we can only imagine. Let us hope that Dr. Gray has had the courage to face these ugly facts in the inquiry now going on, and that an explanation of them may not be wholly impossible.

But we must now turn to the second, and in itself the most important, point in the scheme of asylum reform recommended by the Committee. This is "the protection of the patient in the matter of physical care," and provision for "the redress of all grievances, and the remedy of whatever wrongs he may suffer."

Quis custodiet ipsos custodes? Who, indeed, shall keep the keepers themselves? The reply comes in an unbroken echo from the superintendents of asylums: The keepers themselves! But the common objections to committing the personal liberty and safety of patients to the arbitrary and irresponsible control of asylum officials are reinforced by facts in this document which cannot be gainsaid. The "cooking" of Dr. Gray's financial accounts has been publicly and repeatedly charged for seven years past, and the facts would surely have been contradicted had it been possible for him to do so. But if his financial accounts are false and deceptive, what confidence can be placed in his returns of the number discharged recovered each year, or in his statements as to the non-recovery of those detained? The most important safeguard demanded by advocates of asylum reform is, no doubt, that which shall prevent the admission and detention of those not legally insane. That there is a distinction between medical and legal insanity, which asylum officials have always ignored but which it is practically of the greatest importance to establish, is quite certain. Upon this point medical experts have either become confused themselves or have endeavored to confuse others, to an extent which has made their name a by-word and a reproach. That kind and degree of mental disorder which makes a proper case for medical treatment in the opinion—not always disinterested—of a lunacy specialist, is not the insanity of law, and does not properly deprive the patient of his right to liberty or destroy his responsibility. Nothing appears to have impressed the Senate Committee more strongly than the necessity of placing some effective check upon the power, now practically ab-

solute, of asylum superintendents to detain persons as insane. For this purpose they recommend the creation of a Lunacy Commission, with ample powers. Governor Cleveland, in his last message, advises the withdrawal of all financial duties and responsibilities from the medical officers of asylums, so as to insure their disinterested judgment in regard to patients. We hope that both these measures may be adopted by the Legislature.

Another important question raised in the testimony before us is that of mechanical restraint in the care of the insane. The statement of Dr. Bucknill, made eight years ago, that Dr. Gray declared to him that "he did not use restraint," was introduced, and Dr. Gray was given an opportunity to deny the charge of Dr. Wilbur, that about forty cribs and twice that number of muffs, waist-belts, etc., were in regular use at the Utica Asylum at that time. The opportunity was not improved, however, and we must wait the publication of testimony now being taken for additional evidence in regard to Dr. Gray's use of these agents. The present investigation, it is well known, was ordered on account of the fatal injury of a patient, Evan D. Hughes, by his attendants, on the 26th of January last, in their efforts to punish and subdue him. His jaw was fractured, the walls of the thorax were crushed in, and the lungs were lacerated. The history of this case presents a singular likeness to that of Tarbell, noticed in the *JOURNAL* for April, 1882 (p. 352). They were brought to the asylum from the same neighborhood, their injuries were almost precisely the same, and were inflicted in a similar manner. Tarbell, being the younger man, lived ten days, while Hughes died at the end of a week. In Tarbell's case the attendants attributed the patient's injuries to a "fit in the night," and denied all further knowledge of them, although a severe struggle with the patient was admitted. From a lack of cunning or audacity, the attendants of Hughes could not conceal the violence done him, and substantially confessed it. In both cases the morbid symptoms were but slightly obscured by the mental disease, which apparently had no effect in either to delay the fatal termination. In his testimony concerning the case of Tarbell before the Senate Committee, Dr. Gray declares that "the injuries were inflicted upon him before he came to the asylum," and that "his brother-in-law gave a full account of when and how" this was done. But not a single fact appears in the evidence taken by the Legislative Committee to confirm this statement. The brother-in-law swears that he did not inflict the injuries, and that he gave no such account as Dr. Gray relates.

Dr. Gray's managers, indeed, declare that the evidence in regard to a struggle with Tarbell on the day before he was taken to the asylum (eight days before the first symptoms of illness or disability were noticed), "in connection with the testimony of Drs. McNaughton and March, of Albany, is sufficient to account for the injuries of the patient, and remove all doubts as to the cause of his death." But the testimony shows that not one of five physicians, including Drs. McNaughton and March, could be brought to swear that it was possible for Tarbell to have received his injuries and show no signs of bodily illness or injury for a week afterward. A sixth practitioner held the same view at the inquest, but was converted to Dr. Gray's theory in time for the Legislative investigation. This theory, however, which was the main ground for the defence, seems in fact to have been its *reductio ad absurdum*. Dr. Gray had not only to suppose that every symptom which would naturally follow upon twelve fractures of the ribs and sternum and a penetrating wound of the lung, was suppressed by the patient's insanity, but that all morbid action, local and general, was stayed for eight days by the insanity, and that at the end of this period, *without any change in the mental condition*, the morbid processes began and went on, as in the case of a sane person, to the fatal result.

In both of these cases the coroner's jury brought in a verdict of death from injuries received at the hands of attendants. In Tarbell's case the asylum management was only mildly censured by the Committee, but the evidence taken was so damaging to the asylum that it was withheld from the public. May it not be that the missing testimony from the Senate Committee's document has been withheld for the same reason? Is it not possible, also, that the testimony taken by the Assembly Committee last year, the whole of which was "mis-laid" for ten months after it was ordered printed, has had a narrow escape from a similar fate? The coincidence in these cases is certainly remarkable, and it is to be hoped that the Committee now investigating the Utica Asylum will give due heed to the warning which it suggests. Their report is looked forward to not only as a final verdict on the Utica type of asylum management, but as a basis of legislation in behalf of asylum reform, so long delayed by the boldness and skill of its opponents.

Editorial Department.

PHILANTHROPY VERSUS SCIENCE.

THESE has been a decided advance made in getting American hospitals for the insane out of the rut in which they were being run by a set of mutual admirationists ; but this advance has been in the direction of humanitarianism rather than scientific progress, and it would appear that scientific progress was somewhat incompatible with the humanitarian cant which has of late afflicted both the great English-speaking countries. The professional philanthropist is abroad, and in the desire to appear humane to the insane he exhibits much the same characteristics as the mother who spoils her child for fear of hearing it cry. The English have at the head of their professional philanthropists the Earl of Shaftesbury, the nature of whose intellectual operations may be judged from the following testimony given before a parliamentary investigation committee : " I think something has been said about having what they call a system of special doctors. I confess to you that I have a very great fear of a special doctor. But, assuming them to be good, in the first place they must be very numerously spread over England and Wales, because they are wanted at the instant, and were there not an ample supply of them you would have to send a great distance to reach these special doctors. I should like to see how Parliament would define a special doctor before I can give an opinion. I confess I should be very much alarmed if there were persons who kept themselves exclusively to that study without a constant experience of both, of all the various circumstances that beset lunacy at large and

under confinement, moral as well as physical, that attend it ; all the social circumstances, the ten thousand other circumstances.

* * * I remember the case very well of a medical man, a doctor, an excellent man, who thought that I had some influence in obtaining the appointment of medical men to the commission. I knew him very well. He came to me and told me what he wished. To show his extraordinary knowledge of the subject, he gave me a sheet of paper as big as that, with a list of the forms of insanity. 'My dear sir,' said I, 'this will never do ; if you reduce your principles to practice you will shut up nine tenths of the people in England,' and so they would. If you have special doctors they would shut up people by the score." And the man who is capable of uttering the arrant nonsense contained in the latter part of this quotation is regarded as a well-informed man ! Such puerile reasoning would disgrace a school-boy. To the cant of such philanthropists is due the widely-prevalent error concerning the frequent incarceration of sane people and the publication of items reflecting on alienists, like the following : "Editors threaten to become experts in craziness, while mad doctors have fallen into grave disrepute. Mrs. Weldon, despite her eccentricity and vanity, is hailed as a public benefactor because of the light she has thrown on the laxity of the law, and has been granted a new trial in the case against a 'mad doctor' lately decided against her in a very strong judgment by one of the courts. While thus she has gained public opinion to her side, she has estranged it from her by the restlessness of her *desire for notoriety, singing in a low-class music hall after having been the friend and companion of Gounod and one of the most fashionable vocalists of London.*" A poor insane woman, who has the ability of the paranoiac and the moral perversity sometimes accompanying that psychosis, rouses the sensation-lovers by a tale of incarceration in an hospital for the insane, and is in consequence permitted to disgrace herself and her friends by indulgence in vicious conduct, which is the product of cerebral lesions, when but for the unscientific cant of philanthropists like the Earl of Shaftesbury and others like him in authority, she would have

remained under the conscientious surveillance of an alienist or in the kindly shelter of an hospital for the insane. It is scarcely astonishing that Dr. Boyd, who lately met with so melancholy a fate, should protest against the procedures of the Earl of Shaftesbury's commission as injurious to the best interests of science and the insane. The scientific alienist is the best friend of the insane, and any dilettante philanthropy which thwarts his efforts is a curse to science and humanity. Dilettante philanthropy has practically emasculated English psychiatry, and the ultimate object of the same now appears to be directed to the comfort of the insane in the spoiled-child sense rather than cure. Dr. Godding well says: "In the temple of psychiatry to-day modern philanthropy writes over all this inscription: 'He opened the doors. He broke the chains,'" and says there is no higher line than that. But the humanity of another age will write above it: "And they brought unto him those who were lunatics, and he *healed* them."

HALF-TRUTHS ON THE WITNESS-STAND.

It cannot be denied that a spirit of partisanship too often enters into expert investigation; while this is to be regretted, it is necessarily unavoidable, from the nature of things, when the physician, from at first hearing only one side of the case, unconsciously acquires a bias from which he is afterward unable to rid himself. While some of the differences in expert testimony are to be referred to this cause, the great differences arise from a different state of things. Dr. H. B. Wilbur, a short time before his death, said: "Expert testimony should be the colorless light of science brought to bear upon any case where it is summoned. It should be impartial, unprejudiced. There should be no half-truths uttered; and suppression of the whole truth is in the nature of false testimony." It is to this last circumstance that the great evils of expert testimony are to be referred. The expert does not state the whole truth of science on the subject, but only such phases as fit the case. In the Laros case, for example,

the expert for the prosecution, being asked to describe epilepsy, described the *grand mal* only, and reference to the *petit mal* had to be drawn out of him by rigid cross-examination. In an Illinois case one expert for the prosecution acted in just the same way ; and another, on being asked if an epileptic could remain in contact with other men for months without being suspected, replied that he could not ; on cross-examination it was found that he meant, although he did not so state, only that *grand mal* could not escape detection under such circumstances. Now, whether the diagnosis of these experts was correct or not, such statements cannot be regarded other than as the utterance of half-truths, and for these there is no excuse. Experts may honestly differ as to diagnoses, but such difference does not justify the suppression of well-established facts in science. Here is the great source of distrust of expert testimony, and one of the reasons for its contradictory nature. For such testimony there is, under the existing state of things, one remedy—the scientific physician should assist the lawyer to cross-examine the opposing expert on the fundamental principles of science. Such a course will not be objected to by any honest expert, and is doubly called for in the case of dishonest experts. It will make cross-examination an excellent means of eliciting truth. No respectable expert will aid an attorney in badgering another ; but cross-examination as to knowledge of the principles of science is a very different thing.

RETROGRADE PROGRESS.

It is stated that it has been determined to strike psychiatry from the list of subjects required in the German State's examination. From this it is evident that the so-called "practical" spirit is beginning to dominate the German mind. The present system of examination has not imbued the average German physician with an enormous knowledge of psychiatry, since a German railroad physician testified in a recent case that a patient who presented all the physical and some of the mental symptoms of parietic dementia was, although but forty-three years old, suffering

only from the effects of senility. If such blunders are possible under a State examination which requires a knowledge of psychiatry, how much worse will things become when such knowledge is no longer required as a preliminary to a license to practise? No doubt in time, if this "practical" spirit spreads, the "politician expert" will make his appearance in Germany, and he will be of even a meaner type than the American, for public opinion will be without effect on one made an expert for family reasons. This procedure of the German authorities is a decidedly retrograde movement, which cannot but have baneful results, and it seriously reflects on the German alienists that such a procedure should have been proposed.

NATIVISM IN SCIENCE.

IT is to be regretted that there should creep into German scientific literature a nativistic tone which far exceeds any thing of the same kind with which Germans are so fond of charging the French. This nativistic tone is to be noticed especially in the criticisms on American contributions to medical science. In a report on Guiteau's brain, the editor of this journal called attention to certain artefacts. Dr. Pick, adopting the patronizing German nativistic tone, declared that such artefacts were long known to the Germans. It is a fact, easily demonstrated by a reference to the literature, that an American observer in this journal first called attention to the influence of alcohol in producing these artefacts, and it can also be shown that German authors, notably Schüle, for years after the appearance of this American contribution, were delineating and describing these alcoholic artefacts as pathological lesions, without producing a single deprecatory comment from their German alienistic confrères. It certainly is not a healthy sign, from a scientific point of view, to find this nativism so prominent in German medical literature. Even if the case were as stated by Pick, that is no reason for making the question a national one. Certain recent cases reported by Guntz show that there are German physicians as venal and incapable of giving true expert

testimony as even medical politicians in the United States ; but it would be unjust to charge the German medical profession as a whole with venality and incapacity. The sooner the German alienists abandon this tone of patronizing criticism, the more dignified will their position become. There is a somewhat trite old proverb which is perfectly applicable to the present case : " Those who live in glass houses should not throw stones."

MISTAKEN ECONOMY IN THE TREATMENT OF THE INSANE.

IT is a matter of common observation that when hospitals for the insane are run on the " poor-house " plan, the patients suffer as the paupers, described in " Oliver Twist," did under the dietary prescribed by the " board." The English justices of the peace and their counterparts in America—the county and other local charity commissioners of the various States,—as a general rule, seem actuated by the most narrow ideas of economy, and, as a result, the condition of the insane in the county almshouses of many of the States is disgraceful to humanity. In Massachusetts, for example, long ere the era of Butler, the insane in the almshouses were starving and freezing in filthy dens, while millions were being spent on the palatial institution at Danvers. For a long time the hospital for the insane in the county in which Chicago is situated was run on a similar plan, and the patients were treated by *salaried* non-graduates in medicine appointed for purely political reasons. At last the profession of the city, stimulated by the movement of the New York Neurological Society, attempted the reform of these institutions, and as a result an able and conscientious superintendent was appointed, who reduced restraint, increased the privileges of the patients against ignorant, stupid, and venal opposition from his political superiors. Through his efforts provision was at length made for the utilization of the clinical facilities of the institution, and a special pathologist, Dr. S. V. Clevenger, was appointed. After years of incessant labor this superintendent, Dr. J. C. Spray, has succeeded in putting the institution on the proper basis as an *hospital* for the insane, and now it is proposed

to abolish the essential characters of the hospital and replace the superintendent by the almshouse authorities, who shall sway the insane as they do the paupers. The pathologist's position is also to be abolished, and all the measures taken to utilize the clinical advantages of the hospital are to be abandoned. From every standpoint such procedures, based purely on economical reasons, should be denounced. They are opposed to humanity, to the interests of science, and to ordinary foresight. It is to be hoped that the Cook County (Illinois) Commissioners will discern, from the public indignation with which their economical projects are greeted, the criminal absurdity of the proposed economical reforms.

Our neurological friends in Philadelphia have recently organized a "Neurological Society," with the following list of officers:

President, Dr. S. Weir Mitchell.

Vice-Presidents, Dr. Charles K. Mills, Dr. J. W. Kerlin.

Secretary and Treasurer, Dr. J. Hendric Lloyd.

Recorder, Dr. Lewis Brinton.

Council, Dr. Wharton Sinkler, Dr. L. Preston Jones, Dr. J. T. Eskridge.

Our New York Society of similar aims is chronologically ten years ahead of the Philadelphia organization—a superiority that it can never be deprived of, though one at the same time not to be proud of, except so far as to show that we here have long recognized the necessity of organized special work.

The new Society will give an impetus and an emphasis to that line of work in our neighboring city so long and so well represented by the name and fame of its new President, and so ably, industriously, and conscientiously pursued by its new Vice-President and fellow-officers. In other pages of the JOURNAL will be found the proceedings of the new society.

We extend to our fellow workers our heartiest wishes for success.

Periscope.

a.—PHYSIOLOGY OF THE NERVOUS SYSTEM.

RHYTHMIC CONTRACTION OF THE CAPILLARIES IN MAN.—Dr. Brunton has made some observations on this point. After noting the fact of rhythm in the bat's wing, the rabbit's ear, the tongue of the frog, the arteries of the connective tissue, the vena cava and pulmonary vein of the rabbit, he states that rhythmic contractile power seems to be a common property of all the blood-vessels in the body, and belongs to involuntary muscular fibres generally. Mechanical distension seems to have a similar effect in stimulating rhythm. In man Brunton observed the rhythm in cases of aortic regurgitation; when the aortic valves were incompetent the blood flows back into the heart during diastole, leaving the pressure in the arterial system low. The heart thus receives, during diastole, blood from two sources, from the pulmonary veins and aorta, so that at the next systole a very large wave is forcibly driven into the relaxed aortic system. This gives rise to the water-hammer pulse of Corrigan, and the alternate distension and relaxation of the small arteries render pulsation in them much more readily observed than ordinarily. The method of observing this is as follows: The finger-nail should be drawn once or twice up and down the middle of the forehead; a red streak is left which will sometimes remain for many minutes. This streak undergoes variations of width and brightness which are very evident to the eye, and some of which coincide with the beats of the heart. In some cases the pulsation is so evident that the pulse of the patient can be counted with ease at a distance of five to six feet. In the red streak just mentioned it is quite easy to observe, in addition to the visible pulse corresponding to the cardiac beat, a second rhythm of contraction and dilatation corresponding to the respiratory movements. In addition to these two rhythms there appears to be a third, which Dr. Brunton is inclined to regard as due to independent contraction of the minute vessels and corresponding to the rhythmical pulsations already described as occurring in the lower animals. On account of the difficulty of seizing the exact moment at which the red streak attains its

greatest and least breadth, and on account of the interference of the cardiac and respiratory rhythm, it is difficult to ascertain precisely the rate of the capillary rhythm. From a number of observations he thinks the rhythm is at the rate of one for twenty seconds, so that the respiratory rhythm is about six times, and that of the pulse twenty-four times as rapid, as that of the capillaries.—*Journal of Physiology*, vol. v., No. 1.

THE ACCELERATOR NERVES.—Dr. W. H. Gaskell has made a number of experiments upon these nerves. He selected the crocodile, for the reason that he was a cold-blooded animal whose nervous system would closely resemble that of the mammal. The accelerator nerves of the crocodile leave the main sympathetic chain at a large ganglion corresponding apparently to the ganglion stellatum of warm-blooded animals, and accompany the vertebral arteries up to the superior vena cava, where they leave the arteries, and, passing alongside the vein, anastomose with branches of the vagus in the neighborhood of the heart. Stimulation of these nerves increases the rate of the cardiac rhythm and augments the force of the auricular contractions, while stimulation of the vagus slows the rhythm and diminishes the strength of the auricular contractions. Stimulation of the sympathetic before its entrance into the combined ganglia of the sympathetic and vagus produces purely augmentor-effects. Stimulation of the vagus within the cranial cavity before its entrance into the ganglion produces purely inhibitory effects. Now, in the frog, stimulation of the vagus produces two opposing effects: the one of inhibition, the other of augmentation. From the above experiments it is seen that the vagus of the frog is in reality the vago-sympathetic; that it is necessary, in order truly to investigate the nature of inhibitory action, to experiment upon that portion of the vagus nerve which lies within the cranial cavity, and is therefore free from admixture with the opposing sympathetic fibres; and that finally the so-called "accelerator" nerves ought to be termed "augmentor," or, perhaps better, simply cardiac sympathetic nerves, for acceleration is only one of their functions.—*Journal of Physiology*, vol. v., No. 1.

STIMULATING PERCUSSION.—Dr. J. Mortimer Granville made a communication before the English Physiological Society upon the results obtained by percussion with his percuteurs. He summarized his results under two heads: "Sensory Phenomena" and "Motor Phenomena."

Sensory Phenomena.—The sensory impression produced by percussion at a fairly high speed is divisible into two phases or stages: (a) the primary or direct—that is, the strictly local or immediate sensation, which is either slight tingling or pricking, or smarting; (b) the secondary, or indirect, which is partly propagated and partly induced. This varies greatly with the individual

subject, and apparently in proportion to the density of his tissues rather than the general quality of "sensitiveness," for strongly-built and healthy men often feel the secondary effects of percussion more distinctly than "highly sensitive" women. The galvanometer does not indicate any evolution of electricity.

Motor Phenomena.—The motor phenomena which percussion is capable of eliciting are either directly reflex or so far "organized" as to be independent of the will. Consequently if the centres with whose action consciousness is associated come into operation they inhibit the response of the normally subordinate centres. It is only when either the attention is diverted or there is some block in the line of communication between the volitional and the automatic or reflex centres, so that the last-mentioned are able to act independently or in spite of restraint and control, motor phenomena can be obtained by percussion. In locomotor ataxia, the tibialis anticus, the peronei, and the extensors can be thrown into a spastic condition with a contracture nearly resembling cramp, but the moment the patient brings the will into action he can overcome the contracture and the phenomenon disappears. A notable fact is the induction of movements in an opposite limb by percussion on the other, although the two legs have been extended on different chairs, and every precaution has been taken to avoid the transmission of the mechanical stimulation.—*Journal of Physiology*, vol. v., No. 1.

CONTRACTION OF THE VAGINA.—Dr. Jastreboff has made a series of experiments upon this subject, using rabbits. Their vagina normally has rhythmic spontaneous movements, and the curve of the contraction does not change by the insertion of an inflated ball. Warming the animal above normal increases the contractions and the tonus of the organ. Cooling the vagina to 37° C. makes the contractions stronger without changing the normal tonus of the organ.

Chloroform mixed with air primarily increases the activity of the vagina, then depresses the tonus and the strength of the contraction, whilst the vagina is more relaxed. Ether, in the beginning, increases the strength of the contractions; then they become less frequent without diminution of their strength. After section of the spinal cord at different levels, and finally after destruction of the whole lumbar cord, the vaginal contractions continue. After section of all the sympathetic branches the contraction still continues. The vagina, automatically, has a rhythmic contraction, due to a nervous system distributed in its walls. The vagina reacts not as a muscle but as an organ endowed with nervous centres. He arrives at the conclusion, that in the lumbar cord is an excitation-centre for the vagina, and in the medulla oblongata an inhibitory centre.—*DuBois' Archiv für Physiologie*, 1884, erstes und zweites Heft.

THE MECHANISM OF DEGLUTITION ; ITS IRRITATION AND ITS INHIBITION.—Drs. Kronecker and Meltzer have made another series of experiments upon man. Their conclusions are as follows :

1. When a gum-balloon lies in the first segment of the œsophagus, and two or more acts of deglutition follow whose interval was less than 1-2", then the contraction first ensues after the last act of deglutition. When the balloon lies in the middle segment of the œsophagus, then the intervals between the acts of deglutition can be increased to 3" without the contraction ensuing before the last act ; and from the third act of deglutition the swallowings can follow at intervals of 5-6" without a contraction following before the last act of deglutition. These facts show that by every act of deglutition there is inhibition.

2. The pauses between the last act of deglutition and the contraction are longer the greater the number of previous acts of deglutition. The time of the contraction is not influenced.

3. When a second act of deglutition is instituted whilst the first ensuing contraction has already begun in the observed segment of the œsophagus, then this contraction is not removed, and the contraction of the œsophagus corresponding to the second act of deglutition begins as late as the second act of deglutition follows after the end of the first contraction of the œsophagus ; in other words, the second motor stimulation is first sent out when the movement first ensuing is over.

4. When a person swallows drinks rich in carbonic acid, there ensues after the fourth act of deglutition a contraction of the œsophagus lasting considerable time. This can not be inhibited by frequent acts of deglutition. By rabbits with the cardiac end of the stomach exposed, there is seen with every deglutition a small dilatation of the cardia.—*DuBois' Archiv*, 1883, Supplement-Band.

HOW QUICKLY IS THE NERVE EXHAUSTED ?—Dr. Wedenskii has made a series of experiments upon the subject, using the telephone and the galvanometer. He used the nerve-muscle preparation of the frog and tetanizing induction currents. The irritation of the nerve lasted from one to nine hours, and during this whole time he observed the negative variation by the galvanometer and the telephonic changes.—*Centralblatt f. d. med. Wissenschaften*, 1884, No. 5.

THE PHRENIC NERVES.—Drs. V. Anrep and Cybulski have made a series of experiments upon this subject. The irritation of the central end of the phrenics exercises an influence upon the frequency and depth of the respiratory movements. The effects are different, according to the strength and time of irritation. Section of the vagi or superior laryngeal does not change the effect of the irritation. The irritation of the central end of the phrenic exercises a peculiar influence upon the arterial tension. The first ef-

fect is a more or less marked increase of blood-pressure, followed by a fall which reduces the arterial tension to about normal ; then ensues a second rise, followed by a second fall similar to the waves of Traube-Hering. They reach the conclusion that the phrenic nerves have a special relation to the vaso-motor and the cardio-inhibitory centres.. *Pflüger's Archiv*, Band 33, Heft 5 und 6.

THE ACTION OF PILOCARPIN AND ATROPIN ON THE MILK SECRETION.—Dr. D. Hammerbacher has studied the subject, using the **cow**. Röhrig has already announced that pilocarpin is no galactagogue, but he believes that it increases the quantity of the milk whilst atropin reduces the amount. *Pflüger's Archiv*, Band 33, Heft 5 und 6. ISAAC OTT.

b.—MENTAL PATHOLOGY.

CIRCULAR INSANITY.—Tonnini (*Archivio Italiano per la Malattie Nervose*, July, 1883) finds that circular insanity may occur in three forms. In the first type mania and melancholia alternate ; in the second, melancholia and mania ; and the third is the periodic type, in which a lucid period intervenes either between the melancholia and mania, or the melancholia passes into mania, and this is followed by a lucid interval, or the mania passes into melancholia, and this is followed by a lucid interval. The period of depression, according to him, presents few peculiarities. The melancholia is usually a simple melancholia, and rarely of an hallucinatory or delusional type. It may present an atonic phase. The period of exaltation in many respects resembles psychically paretic dementia. According to Karrer and the French authorities the affection is most frequent in females, while the figures given by Krafft-Ebing, Dittmar, Kelp, and Fleming speak for its prevalence in the male sex.

TROPHIC CHANGES IN THE HAIR OF THE INSANE.—Dr. C. Reinhardt (*Virchow's Archiv*.) reports a case of periodical changes in the hair of an epileptic idiot. During the period of excitement the hair changed its color from yellow to red and black ; during the condition of stupor the hair resumed its usual condition. Kiernan (*JOURNAL OF NERVOUS AND MENTAL DISEASE*, April, 1878) called attention to the fact that trophic changes in the hair and skin were frequent in hebephrenia, epileptic insanity, paretic dementia, *folie circulaire*, paranoia, secondary confusional insanity, and periodical insanity. The occurrence of premature grayness in descendants of neuropathic and psychopathic families is not unrelated to the same subject.

BIOLOGICAL RELATIONS OF THE CHILDREN OF PARETIC DE-MENTS.—Dr. Régis (*Journal de Médecine de Bordeaux*, Nov. 4,

1883) states that the four biological characteristics of the families of paretic dementers are: abnormal longevity, lessened vitality, excessive fecundity, and marked tendency to cerebral affections. He is of the opinion that paretic dementia is a cerebral affection presenting psychical symptoms, and not a psychosis properly so called. This opinion has long been held by many alienists. He is of opinion that paretic dementers, not being descendants of lunatics, and not producing lunatics, their children, as a rule, escape vesanic heredity, but have a tendency to cerebral affections. A physician's advice being asked as to the future of the child of a paretic dement, he should say that such a child is not especially predisposed to insanity, but is likely, at critical periods of life, to suffer from cerebral affections.

INSANITY IN A TEN-YEAR-OLD BOY.—Dr. Ringrose Atkins (*Dublin Journal of the Medical Sciences*, March, 1884) reports a case of acquired mental derangement in a boy, nearly ten years old, which was believed to be due to fright consequent on accidental immersion. For the past eight months the boy has been progressively losing mental power, and lately has become excitable, extremely passionate; using, when aroused, foul language. He is quite incoherent, and the volitional and emotional faculties are deeply affected. The history of the case suggests epilepsy, but as to that nothing is said by Dr. Atkins.

MENTAL SYMPTOMS FROM ORDINARY BRAIN DISEASE.—Dr. Gasquet (*Journal of Mental Science*, April, 1884) has reported four cases: one of multiple cerebral sclerosis; one of cerebral syphilis; one of "multiple thrombosis"; one of post apoplectic insanity, all of which exhibited absurd unsystematized delusions like those of paretic dementia. Probably all four were really cases of paretic dementia complicated by the conditions mentioned. Certainly diagnostic details sufficient to show the contrary are not given. The question whether coarse brain disease may not initiate paretic dementia is one which has as yet received but too little attention.

PROGNOSIS AND DIAGNOSIS IN INSANITY.—Sankey (*Liverpool Medico-Chirurgical Journal*, January, 1884) states that the subject of prognosis in insanity resolves itself into the question whether the case is one of "ordinary" insanity or paretic dementia. He gives the following criteria for diagnosis: First, the mode of invasion in "ordinary" insanity will be by depression. Paretic dementia, as a rule, begins by hilarity, busy occupation, absurd conduct, and garrulity. Now these criteria are valueless. In the first place, the statements about "ordinary" insanity are based on the exploded *doctrinaire* dicta of Griesinger, and show a great ignorance of modern researches. In the second place, paretic dementia far from infrequently begins with depression, and even mutism, and it may present the facial expression of

depression with a condition of exaltation, and *vice versa*. Second, in "ordinary" insanity the emotions alone are affected. Now this is not true as regards all forms of "ordinary" insanity, and it is true of certain cases of parietic dementia. In parietic dementia all the faculties are involved in a state of exaltation. Now this is not true of all cases of parietic dementia, and it is true of some cases of "ordinary" insanity, "hypomania" for example. Third, in the depression of "ordinary" insanity the patient wishes for solitude. The parietic dement rushes into all kinds of society; both equally true and untrue. Fourth, in "ordinary" insanity the affection commences in an insidious manner. Parietic dementia follows upon some great mental shock in persons of sanguine temperament and great mental activity. There is as much if not more error than truth in these statements, and as diagnostic criteria they fail just where they are needed.

DEFINITION OF INSANITY.—Dr. Buttolph (*American Psychological Journal*, January, 1884) has recently given the following definition of insanity. "Mental derangement consists essentially in an unbalanced state of the faculties of the mind arising from an excited, depressed, or otherwise changed action in the physical part on which the disordered faculties depend for their manifestation." This is decidedly indefinite.

HEART DISEASE AND INSANITY.—Dr. B. Salemi-Pace (*Il Pisani Gazzetta Sicula Anno IV.*) says: Necroscopic observations made among the insane dying in the Manicomio of Palermo have shown that seventy-five per cent. of them presented evidence of cardiac disease. These figures approximate to those reported by Burman, Berti, Tamassia, and Dufour, but are not in accord with those of Griesinger and Leidesdorf. These latter results contain many elements of error. The results of Dr. Salemi-Pace do not favor the generally accepted view of the influence of cardiac disease in the production and modification of insanity, but show that insanity more frequently favors the production and modification of cardiac disease. The principal cardiac lesions found by him were hypertrophy of the left ventricle, atrophy of the right ventricle, degeneration of the myocardium, and a general fatty state of the heart. Kiernan (*American Journal of Neurology and Psychiatry* March, 1884) independently comes to very similar but not so positive conclusions.

PARETIC DEMENTIA.—Dr. Geo. F. Jelly, (*Boston Medical and Surgical Journal*, No. 10-11, 1884) states that the proportion of female to male parietic dement in three Massachusetts State hospitals for the insane, was eighteen to sixty-three. He is inclined to believe that not infrequently some shock or acutely painful impression upon the moral sensibilities seems to furnish the additional weight needed to overcome a brain already tottering. He has seen cases of six and eight years' duration. Dr. Jelly seems

unacquainted with the fact (of which the case last cited by him furnishes a striking illustration), that there is a parietic hypochondriasis. He says that the affection may be ushered in by a melancholia, distinguishable from true melancholia by the greater mental weakness. In his opinion, the condition of the patellar tendon reflex is of some diagnostic value. In certain cases it is exaggerated, in others normal, and sometimes diminished; in the early stages it is, as a rule, exaggerated. When it is absent, disordered gait is an early symptom. The optic-nerve changes, in his opinion, present nothing characteristic. Spitzka (*Æsculapian* March, 1884) states that the prodromal symptoms of parietic dementia are: First, depression, partly the logical result of the patient's apprehensions. Second, diminished power of application and concentration. Third, varying degrees of irritability. Fourth, lack of true emotional depth associated with emotional automatism. Fifth, vaso-motor spells usually following meals and exertions. Sixth, peculiar "gap-like" failures in memory. Seventh, transitory focal symptoms pointing to the brain-axis as their seat. He further says, as an additional element in diagnosis, that in no psychosis are the variations in the prodromal period so rapid as in parietic dementia. Kiernan (*Detroit Lancet*, March, 1884) expresses the opinion that the essential and primitive anomaly in the parietic dement's brain is a vasor-motor disturbance.

STRENGTH OF PARETIC DEMENTS.—Descourtis (*L'Encéphale*, No. 1, 1884) concludes: First, the strength of parietic dementis diminishes, as a rule, from the onset of the affection. Exceptionally robust individuals, and those in whom psychic symptoms are alone present, retain their muscular strength. The dynamometer gives a mean of 34.7 right and 30.2 left in lieu of 54.3 right and 47.1 left. Second, this enfeeblement seems to affect both sides in a nearly equal ratio. Third, the loss of power is far from following a continued course. There are very decided alternations, even independently of those produced by the convulsive phenomena. Fourth, the marked oscillations in the curve seem to indicate that parietic dementia proceeds by leaps, even when no external symptoms indicate this. Fifth, the changes in the right and left side do not follow a parallel course other than the equilibrium mentioned. Sixth, there is no relation between uncleanness and lack of strength. Seventh, in Dr. Descourtis' opinion dynamometrical researches may reveal unsuspected complications in parietic dementia, and therefore prove of value from a prophylactic standpoint.

OÖPHORECTOMY AND INSANITY.—Dr. Lee (*New York Medical Journal*, July 14, 1883) has recently cited a case in which an operation for removal of the ovaries was done in the case of a patient suffering from pelvic pains and hysterical symptoms, and after the operation, although the pelvic pains ceased entirely, the mental

symptoms at once became worse, and finally the patient had to be sent to a hospital for the insane. While it is possible the operation aggravated the case, it is much more probable that the aggravation of the symptoms, like their so frequently reported improvement, after oöphorectomy, was merely a coincidence. Dr. Thallon (*Archives of Medicine*, April, 1884) in discussing this subject, says that oöphorectomy is of value in insanity only where the ovaries are organically affected, and thus lead to insanity, but gives no means of determining this.

HEBEPHRENIA.—Dr. Ball (*L'Encéphale*, No. 1, 1884) discusses this psychosis in a recent lecture. He says it develops in the majority of cases insidiously. The victim experiences a vague melancholia which does not exclude gaiety. The patient seems to play with his delirious conceptions, and, in the midst of his depression, begins to joke and laugh. He has vague ideas of persecution by his neighbors, friends, and relatives. The prognosis is grave. The affection, in Ball's opinion, is much more frequent than the figures of Schule would seem to indicate. Ball fails to recognize the fact that imperative conceptions are relatively frequent among hebephreniacs.

VERTIGO AMONG THE INSANE.—Dr. J. Miller (*Annales Médico-Psychologiques*, March, 1883) concludes: First, vertigo is of frequent occurrence among the insane. Second, mania is least often affected by vertigo. In melancholia, especially of the anxious, vertigo is much less rare. Vertigo is quite frequent in acute and chronic alcoholism, in senile, apoplectic, and paretic dementia, and above all in epilepsy. Third, vertigo may present marked variations in type from slight dizziness to convulsive and apoplectic attacks. Fourth, vertigo may be accompanied with partial convulsive phenomena, psychical symptoms, hallucinations, extravagant and violent acts. Fifth, unconsciousness and amnesia are the rule when the vertigo is of epileptic origin. These symptoms may be absent when the vertigo is of another nature. Sixth, vertigo is more frequent among males than females. Seventh, they appear to be due to a general or partial, direct or reflex, congestive state of the nerve-centres. Eighth, they can be treated with advantage by saline purgatives and revulsives; abstinence from alcohol when of alcoholic origin, and with alkaline bromides when they depend on epilepsy. Ninth, persons acting under the influence of vertigo should be held irresponsible.

VARIOLA AND INSANITY.—Dr. E. Quinquad (*L'Encéphale*, No. 1, 1884) concludes that auditory and visual hallucinations, and vesanic phenomena are far from infrequent in the course of variola. These disorders of the intelligence are not, as a rule, of long duration. This last conclusion is much too strongly put.

ELECTRICITY IN INSANITY OF SEVEN YEARS' DURATION.—Dr.

Robertson (*Journal of Medical Science*, April, 1884,) has had under observation the following case: A fifty-year-old woman entered the hospital under his care with delusions of persecution and suspicion, which had existed for six years prior to admission. Fifteen months after admission, treatment by galvanism was commenced, the patient's condition having up to that time remained unchanged. The continuous current from a Leclanche forty-cell battery was used; the positive pole was applied over the superior cervical sympathetic ganglion, and the negative was slowly moved from brow to the occiput, and up to the middle line of the skull on the same side of the head for about seven minutes, then changed to the other side and applied for the same time. The patient gradually, and with some ups and downs, improved; the strength of the battery having had to be gradually diminished as the patient became more sensitive to its influence. The patient, by March 19, 1883, had completely recovered, and was discharged. At last accounts (January 20, 1884) she had continued well. A curious and interesting observation bearing on the pathogeny of hallucinations occurs. The patient, Nov. 10, 1882, heard voices of men; January 10, 1883, she did not hear the voices unless she made an effort, and then only a little. This she thinks shows that the voices are *in her head and not real*. It is probably from the history that the psychosis was a vaso-motor one of climacteric origin, and the beneficial results obtained hint at the propriety of further experiments of this kind in such cases.

SYPHILIS AND PARETIC DEMENTIA.—Kiernan, from an examination of the literature, concluded (*Alienist and Neurologist*, July, 1883). *First*: From neither a clinical, nor a therapeutical, nor a pathological standpoint, can paretic dementia of non-syphilitic origin be demarcated from that of syphilitic origin. *Second*: That the etiological influence of syphilis in the production of paretic dementia has been over-estimated by some authorities. *Third*: That the value of anti-syphilitic treatment in paretic dementia will depend upon the stage at which the syphilis is found, and in no case is it necessarily contra-indicated. These views have recently been corroborated by Dr. H. C. Wood, who says (*Cincinnati Lancet and Clinic*, March 15, 1884) that syphilis may produce a disorder whose symptoms and lesions do not differ from those of paretic dementia; that true paretic dementia is very frequent in the syphilitic; that the only perceptible difference is curability; that the curable sclerosis may change into or be followed by the incurable sclerosis. The criterion of curability, Kiernan has shown to be valueless. He says: "Is curability a valid criterion? Mueller, a hostile witness denies that it is. Dreschfield remarks that 'in the more chronic syphilo-neuroses where the syphilitic deposit has itself undergone degeneration, changes and established secondary changes in the surrounding nerve-matter, treatment will, of necessity, be of little avail,' and this is the opinion of most syphilographers." Spitzka claims that

"in cases where syphilis can be positively excluded, mercurial treatment is sometimes of value." In all probability there can be made no distinctive criterion between luetic and non-luetic parietic dementia. Dr. Wood's article ignores the more recent American literature on the luetic psychoses in a way which seems to call for comment.

INSANITY OF PUBERTY.—Dr. Régis (*Journal de Médecine de Bordeaux*, February 30, 1884) says that it is incorrect to put the psychoses occurring at puberty in one class, as has been done by the Germans, under the title of hebephrenia, but the Germans by hebephrenia meant a type of insanity occurring at puberty, and peculiar to that epoch of human life, and not types of insanity which *may* occur then as at all periods of life. Régis says that the insanity of puberty has but slight gravity and disappears with the critical period which gives it birth, unless it take its origin in decided heredity, in which case it is only the first step in intellectual degeneracy. These opinions are scarcely in accord with the experience of the majority of authors. The cases which have a favorable prognosis are such as have fortuitously attacked the individual at the period of puberty rather than such as are peculiar to that epoch. The hebephrenia of the Germans is a type of insanity met with only at puberty. Under the term insanity of puberty, Dr. Régis has included acute psychoses, paranoia (primary monomania), as well as true cases of hebephrenia.

OTHÆMATOMA.—Dr. Bellangés (*L'Encephale*, No. 1, 1884) has reported a case of hæmatoma, which appeared in a case of what seems to be a hypochondriacal phase of alcoholic insanity rather than lypemania. The patient, without any special traumatic evidence, suddenly suffered from a swelling on the right ear, which, for ten days, increased, then remained stationary for eight, and had begun to decrease when the patient died from exhaustion. The hæmatoma was located in the inferior two thirds of the antihelix and lobe of the helix. Its volume, at first that of a walnut, was on autopsy found to be reduced to one third this size. The skin over the tumor was wrinkled, and the tumor gave uncertain evidence of fluctuation. A transverse section of the ear revealed a large excavation which contained semi-fluid blood. The excavation was sinuous, and its edges hard. The skin presented nothing special. The perichondrium and the cartilaginous lamina enveloped by it were cut in two by a hæmorrhagic patch. The sanguineous exudation had provoked around it an inflammation, and the chondroplasts, as well as the fibro-elastic tissue, in the midst of which it was plunged, had proliferated, and innumerable minute cartilage cells and patches of extravasated connective tissue were noticeable on the edges of the tumor. The situation of the othæmatoma was not as exceptional as Dr. Bellangés seems to think.

INSANITY IN RELATION TO CRIME.—Dr. Bucknill (*British Medical Jour.*, March 15, 1884) proposes the following, as a legal test of responsibility: "No act is a crime if the person who does it is, at the time, incapable of not doing by reason of idiocy or of disease affecting his mind." In no respect is this an advance on the charge of Judge Upton, of Illinois, to the effect that if insanity interfered with the free determination of the will, the prisoner must be acquitted.

TREATMENT OF MELANCHOLIA.—Dr. Tuttle (*Boston Medical and Surgical Journal*, January 24, 1884) reports eight cases of melancholia treated by a combination of the bromides and cannabis indica. Of these one recovered; in two cases marked benefit was obtained; in two the results were doubtful; and in three there were no results. The bromides can scarcely be regarded as indicated in melancholia, and that better results were not obtained from the cannabis indica is due to its association with the bromide. In Dr. Tuttle's opinion both drugs acted chiefly as a sedative. He does not seem to have had more than sedative results from the use of opium, but has obviously not paid any attention to the contra-indications to its use in certain types of melancholia.

CARBUNCLE AND INSANITY.—Dr. Fuzier (*L'Encéphale*, No. 1, 1884) reports two cases in which carbuncle favorably modified two cases of insanity. The first case was one of melancholia agitata, which finally became atonic. During the atonic stage a carbuncle made its appearance between the two shoulders, somewhat nearer the left, which at length assumed enormous proportions. About ten days from the onset of the carbuncle it was opened by the hot iron. Hardly was the dressing completed when the patient suddenly spoke, thanked his physicians for their care, and from this time a course of rapid improvement began. The second case was one of acute mania, during which an enormous carbuncle made its appearance on the dorsal region, followed by increased agitation. The carbuncle was opened by the actual cautery, and this opening was followed by rapid and progressive improvement.

DELUSIONS ORIGINATING IN ILLUSIONS.—Dr. H. M. Hurd (Report of the Pontiac, Mich., Asylum for 1881-82) cites the following cases: A patient who had caries of the femur, and for many years suffered more or less pain at the seat of the disease. This has given rise in his mind to the delusion that hot air is blown upon the diseased limb by enemies to annoy him. Another patient, who had chronic disease of the stomach, giving rise to slow and painful digestion of food, formed the delusion that his gastric pain was due to the action of an invisible machine which was set in motion by enemies at a distance, and bored into his stomach. Another patient suffers from borborygmi, which she

interprets as a voice within talking to her. On other occasions she speaks of it as "something loose" within her abdomen. An epileptic, when he suffers from petit mal, frequently believes that he has a snake in his stomach which moves about and causes pain. When constipated, and discomforted by a loaded rectum, he is positive that the snake has taken refuge there. A patient who suffers from aggravated herpes zoster has a delusion that he has swallowed a large number of persons, among whom are his brother, a priest, and a whole family of children. A patient who suffered from trichinosis had a delusion that worms were crawling through the muscles of his legs. In addition, Dr. Hurd narrates the following cases of illusion: A patient fancied that he heard a voice in the squeaking of his shoes when he walked about the corridor. Another heard voices in the whistle of the locomotive whenever a train passed the asylum. Another heard in the coughing of a consumptive associate a voice threatening his life, and became exceedingly apprehensive of personal injury. Another patient believed that the braying of a donkey utters unpleasant charges against her personal character. It will be obvious from Dr. Hurd's language that he only illustrates the influence of incidental circumstances on pre-existing insanity, and does not at all lend support to the doctrine so zealously propagated by Ball and Régis.

PSYCHIC BLINDNESS IN A LYPEMANIAC.—Dr. J. Cotard (*Progrès Médical*, Jan. 12, 1884) cites the following case: A sixty-eight-year-old male diabetic entered a hospital for the insane in 1872, in a condition of negative lypomania, with setiophobiac symptoms. In three months he so improved as to be able to return to his family. Nine years after he was readmitted, then displaying hypochondriac symptoms, attended by agitation. Later he has been unable to represent to himself mentally the objects formerly most familiar to him. It must be confessed that the case is decidedly impure.

BUSINESS WORRY AS A CAUSE OF PARETIC DEMENTIA.—Dr. H. M. Hurd (Report of the Pontiac, Mich., Hospital for Insane, 1881-82) says that: "The marked diminution in the number of cases of paretic dementia admitted confirms the opinion previously formed, that this disease has a direct relation to business reverses. Since 1873, and the financial reverses which followed it, there has been an increasing number admitted to asylums, until the present biennial period. This falling off can only be ascribed to the greater prosperity of the times, and the absence among business men of those causes of worry and anxiety which always accompany financial crises. Among those admitted during the present biennial period, the disease, in several cases, was ascribed directly to sudden and overwhelming business disasters. In one instance it developed almost immediately after its unfortunate victim had lost his entire property. From present appearances the cases will decrease until a fresh financial revulsion occurs."

While the opinion here expressed is in accord with that of the majority of alienists, certain elements of error may enter into the data on which it is based. Thus "the sudden and overwhelming business disasters" might be due to the bad management arising from unrecognized paretic dementia.

INSANITY FROM LEAD-POISONING. — Dr. S. V. Clevenger, Special Pathologist, Cook County Hospital for the Insane (*Chicago Medical Journal and Examiner*, February, 1884), cites the following case: The patient, a fifty-one-year-old Swede, single, was admitted June 7, 1883, and presented the appearance of mute depression observable in ordinary melancholia, with the addition of epileptiform convulsions. From a friend who visited him, it was learned that the patient had been working in lead three years. Examination revealed the characteristic blue discoloration of the gums and other symptoms of lead-poisoning. The patient was given potassium iodide tonics and bathed freely. Under this treatment he steadily improved, and was discharged fully recovered August 31, 1883. Dr. Clevenger commenting on this case says: "Had the cause of this attack been unascertained, the patient would have died insane." That the long-continued action of lead produces chronic forms of insanity has been shown by Kiernan (*JOURNAL OF NERVOUS AND MENTAL DISEASE*, July, 1881), Ulrich (*Allgemeine Zeitschrift für Psychiatrie*, Bd. xxxix.), Goodheart (*British Medical Journal*, April, 1882), Möli (*Charité Annalen* viii.), and others. Goodheart claims that the sequence of events in lead-poisoning is as follows: Introduction of the lead; vascular tension; arterial spasm, followed by convulsions or insanity, leading to permanently impaired nutrition of the brain, by causing permanent cerebral arterial spasm. In Möli's opinion certain cases are produced by the secondary results from the phenomena produced by lead. Dr. Racine (*Deutsche Medicinische Wochenschrift*, March 6, 1884) reports the case of a thirty-eight-year-old man who was attacked by lead-palsy, followed by acute hallucinatory confusional insanity. The patient had delusions that the Devil had taken up his abode in his abdomen, which delusion evidently had an illusional basis. After about a week of excitement and insomnia, the patient fell into a deep sleep, on awakening from which he was found to be mentally clear but amnesic to what had occurred in the excited period.

CONIUM IN ACUTE MANIA.—Dr. F. Thümmeler of the Cook County Hospital for the Insane, Chicago, (*Medical Journal and Examiner*, Feb., 1884,) has had under observation the following case: The patient, a twenty-four-year-old Bohemian, displayed intense furor maniacorum which would come on without warning. When sitting or standing in the grounds with other patients an outbreak of maniacal furor would come on, and often six attendants were necessary to control the patient. The patient was crafty and agile, and at one time escaped by bolting through the

door, then ran up the ladder to the roof, where he danced over the slates and chimneys with a strait-jacket on. Dr. Thümmeler found great benefit in this case from the use of Squibbs' fl. ext. conium in ten-minim doses *ter in die*. When his dose was missed the patient became violent. He was discharged fully recovered after six months' treatment.

ACUTE MANIA RELIEVED BY ANTI-SYPHILITIC TREATMENT.—Under this title Dr. F. N. Otis relates (*New York Medical Journal*, vol. xxxvi.) the following case of a young man under his care: The patient had been abroad, and had probably led a somewhat dissipated life, but on his return was in an excellent state of health. Shortly afterward, however, he showed symptoms of acute mania; two prominent alienists pronounced his case one of commencing parietic dementia, and gave a very unfavorable prognosis. After remaining in Bloomingdale Asylum several weeks, contrary to expectation he became quite rational, and then said that he had been undergoing a course of anti-syphilitic treatment, and within a short time a syphilitic papular eruption developed. He had now perfectly recovered from cerebral symptoms. How much is this case worth as a test of the opinion of the two alienists mentioned? It can safely be said it is worth nothing at all, since Dr. Otis seems to be totally unaware of the existence of remissions in parietic dementia. It would be advisable, for forensic reasons, for the friends of the young man to adhere to the diagnosis of the alienists while continuing mercurial treatment.

SYPHILITIC DEMENTIA.—Dr. C. K. Mills (*Medical and Surgical Reporter*, Dec. 1, 1883) cites the following case: The patient, a twenty-five-year-old negro, displayed no evidence of paralysis. He had no speech trouble; spoke but little, and could be made to understand with difficulty. A clear history of specific infection was obtained. Under the use of potassium iodide the patient cleared up mentally. The treatment was discontinued, and soon after the patient was taken with an apoplectiform attack; he was unconscious, semi-comatose, and presented a spasm involving both sides but most marked on one. Under venesection he rallied rapidly and is now well, but displays a little "thickness of speech."

SURGERY AMONG THE INSANE.—Dr. Hjerström (*Hygiea*, Band xlv.) reports the case of a forty-nine-year-old periodically insane single woman who was subject to eroticism and had had three children. During one of these erotic attacks she introduced a candlestick-socket into the uterus, where it caused some inflammatory trouble and secondary leucorrhœa. Investigation made as to the causes of the latter revealed the presence of the foreign body mentioned, which was removed. The case suggests the propriety of examining as to the cause of fetid leucorrhœa in female lunatics.

LOW TEMPERATURE IN THE INSANE.—The fact that temperature not infrequently falls far below 98.5° F. in the insane is so little known to the profession, that a résumé of the observations on this subject is likely to be of interest. Dr. Howard ("Philosophy of Crime, Insanity, and Responsibility") says that in his opinion the temperature of the chronic insane is always below par; this has not yet been established. That in certain cases it is, cannot be denied, and this is undeniably the case with epileptics and parietic dementes. Among certain insane and certain neurotic subjects temperature may fall very low. Lowenhardt (*Allgemeine Zeitschrift fuer Psychiatrie*, 1868) reports two cases of insanity in which the temperature was at various times 87.5° F., 89.6° F., and 90.5° F.; these were cases of maniacal excitement. Mendenhall (*Medical Record*, June 4, 1881) cites a case of dementia in which the temperature was 90.5° F. Zenker has (*Allgemeine Zeitschrift fuer Psychiatrie*) studied nine cases of insanity where the bodily heat was found to sink easily; it fell in three cases as low as 90.6° F., and in one instance as low as 87.06° F. Bechterew (*Archiv fuer Psychiatrie*, Band xiii.) has reported two cases of parietic dementia in which the temperature was 93.2° F. and 86.9° F., respectively; one senile lunatic in whom the temperature was 87.8° F. Ulrich (*St. Petersburger Med. Woch.*, 1879) has reported a case of parietic dementia in which the temperature was 91.3° F., and one melancholiac, whose temperature was 83.4° F. Tilling (*St. Petersburger Med. Woch.*, 1876) has had under observation a primary monomaniac, with a temperature of 89.6° F.; a melancholiac, with a temperature of 82.4° F., and two parietic dementes, with a temperature of 83.3° F., and 81.5° F., respectively. Ireland (*Journal of Mental Science*, April, 1884) has had under observation an idiot, with a temperature of 82° F., and like cases reported by Hebold (*Archiv fuer Psychiatrie*, Band xvii.). Phenomena of this kind, from what is now known of the action of the nervous system on temperature, are nothing more than what might be expected. It can therefore be admitted, that a patient having a temperature below 96° , not in collapse, may be suffering from some neurosis, presumably of a psychical kind.

MY SOPHOBIA.—Dr. H. Tamburini, after citing the cases of this type reported by Hammond, Shaw, Russell, and others (*Revista Sperimentale di Freniatria*, Anno ix.), reports the case of a thirty-three-year-old woman whose ancestral history was as follows: A maternal aunt died a paralytic dement; a maternal cousin was morbidly excitable. Her mother was affected with grave squamous herpes; patient being also so affected in her infancy. A brother died of tabes mesenterica. Menstruation appeared at sixteen, but always scanty in quantity, and often preceded by violent pain. In other respects physical constitution was good; character mild, but somewhat obstinate; education and training careful; hysterical disturbances noticeable. At twenty-three she

married and left her own country, taking up residence in a small district which was "sufficiently dirty." During her first pregnancy the morbid psychical phenomena about to be detailed were first noticed. As after a time her morbid washing tendencies were opposed by her family, she began to form delusions of persecution by them. Finally her daily routine was as follows: When she awoke (about five A.M.) her first thought was to find out if all was locked and as she wished. Having awakened her husband, she desired that he would tell her whether all was really closed. He assured her all was so, and that her own good sight ought to show her that all was as she wished it. She said unfortunately she could not believe her own eyes. He went out, and the servant brought his wife's coffee, but did not enter the room, for the lady would not permit it. The lady got out of bed, opened the door a little, and she poured the coffee into a cup and departed. The lady then locked the door and drank the coffee, after which she washed herself, because she believed that in opening and closing the door she had befouled herself, and she put soap into the cup as a remembrance of having washed. She then put on an under-dress, fastening it well around the person, lest that during the day she might lose any thing. While thus engaged, she would say to herself: "I have lived many years without doing these ridiculous things, why am I now obliged to do them?" Having put on her clothes, she washed again to make the bed, selecting different colored soap, writing on it with a pin: *washed at such an hour to make the bed*. If, while making the bed, she heard sweeping, the broom came into her mind, and was thought a dirty object; though she had not touched nor even seen it, yet she must wash. If she heard the street fruit-seller calling out, she must wash herself, through fear of having touched these things, and yet she said to herself, these fruits are on the street, and she therefore did not see them or touch them, and would not wash herself. Afterward she would say to herself, was it because there was no water that she did not wash? She was forced to wash, otherwise she would have no peace. She washed twenty times in making the bed. She pinned the bed all over, with ninety or one hundred pins, to prevent rats getting into it. Having at last finished the bed, which in pinning and in washing took up at least three hours, she put on a frock and dressed her hair; before leaving the chamber, she went round it ever so many times to assure herself whether all was locked, and being insufficiently convinced by her eyes, she tried all again. She left her room about noon, locking the door carefully, and tried it again and again to see whether it was locked; then went to the dining-room, and there tried the sideboard and pantry to see if they were locked; after this she dressed her sister's hair, and then both washed in the dining-room, where they must have soaps of different color from those of the bedroom, in order that she might be sure that they were not still in her bedroom. While they were washing, she often asked her sister if they were really in the dining-room. While the family were dining, she every

now and then went to find out whether the bedroom door was locked, and shook it very strongly, asking her parents if it was locked. They replied that it was, but notwithstanding this, she would have them rise from the table to try it. Then they would return to dinner, and she would say to her parents, weeping: "What fatality! I have strong sight, good memory, and yet cannot persuade myself that all is locked as I wish." They entreated her to have faith in them, for, loving her dearly, they were incapable of telling an untruth. They exhorted her to change her course, and then all would be happy. She replied that such a change was impossible, because she was dragged to the precipice by a force superior to that of her will. The dinner being finished about four P.M., she went to wash the pitchers, basins, etc., in her room, not permitting this to be done by the servant nor the family, who must stand aside and see that no one should come where she was doing this work. After this, she would try again and again whether every thing was locked, and again lock the bedroom door. Her own dinner-hour was about seven P.M., and before eating, she, her husband, children, and mother, who were in their company, all washed their hands, and then dined. She had them to go many times to see whether her bedroom door was locked. Dinner over, she went to her bedroom, intending to go to rest at ten P.M. She then washed her hands to unpin the bed, washed again to undress, looked around to see whether all was well locked, and if the towels were properly placed and her dress properly hung up. She repeated this again and again; then she washed her hands, arms, and face, and got into bed towards midnight. Her husband must not come to bed nor enter the chamber before she was in bed. He washed his hands and undressed himself, for she insisted on it, before entering the room; then he washed his hands and his face again before getting into bed; putting out the lights, she begged him to look whether the drawers, etc., were locked. Sleep gave a truce to her anguish, and she rested five hours. The days on which her laundry work was done were infernal days, both because she feared she should not succeed in doing her work and because of the numerous hand-washings whilst ironing, etc., for she was forced to wash herself every time any thing dirty came into her mind. For a long time she had worn only a few articles of linen and other clothing (which she always washed by herself). These were reduced almost to rags. Whilst she had so great a dread of dirtiness, and such necessity for frequent washings of her hands, she never made general personal ablutions; but, on the contrary, wore her under-clothes a long time very dirty, as no other person in mental health, though very poor, would have done. It will be obvious that in this case there was evidence of logical perversion, and that there was more than the simple imperative conceptions which are said to constitute the only features of this affection. Tamburini's case entered the asylum of her own accord, and fully recognized the morbid nature of her actions.

PRIMARY MONOMANIA.—Björnström reports (*Hygiea* Band xlv.) the case of a thirty-nine-year-old telegraph operator who presented marked hereditary taint. The patient suffered from imperative conceptions and hallucinations; on these last he based delusive religious conceptions which he deemed of such importance that he bored the royal ecclesiastical department with reformatory projects and was at length sent to the asylum. Björnström cites the case as confirming the views of Snell and Sander. Under the title *paranoia* first proposed by Heinroth in 1818, subsequently by Kahlbaum in 1874, and whose use is supported by Arndt, Drs. Silvio and Tonnini (*Archivio Italiano per la Malattie Nervose*, November, 1883) discuss primary monomania, describing it under this term as being less ambiguous than monomania; this last term having from a legal aspect a decidedly sinister meaning. Which of these terms is preferable it remains for the future to decide. Tonnini and Silvio accept in their fulness the doctrines of Sander and Snell. Magnan, in his recent lectures (*Progrès Médical*, November 24, 1883), supports the views of the subject held by Morel, which were the starting-point of the views of Sander and Snell, now being gradually accepted by scientific alienists.

MORAL INSANITY.—Dr. Walter Hay (*Journal of the American Medical Association*, October 27, 1883) revamps in a new form certain old objections to moral insanity, and makes statements which are demonstrably false. He states that all reported cases of moral insanity can be resolved into delusional insanity or wilful vice, which is not true; and he further states that moral insanity rests on the false basis that all mental action originates in feeling, which is not true, since for an adherent of moral insanity to claim that congenital moral idiots exist would be a contradiction in terms under the circumstances. In point of fact the doctrine of moral insanity appeared so strongly to support the doctrine of innate ideas, that Ordronaux denounced it as an attempt to introduce supernaturalism into medicine. Dr. Hay also states, what every alienist clinician will pronounce to be erroneous, that all delusions originate in hallucinations. He also states that insane delusion is the criterion of insanity. It is not surprising with such views that Dr. Hay should deprecate the application of the clinical method to psychiatry. Metaphysical training has its advantages, but it alone applied to attempt the *a priori* solution of psychiatric problems is an absurdity.

PARETIC DEMENTIA AS A MEANS OF CHEATING INSURANCE COMPANIES.—How much the average medical officer of the insurance companies does not know of mental disease has not yet been found out. It will be remembered that one of these gentlemen (appointed like the most for social reasons only) pronounced Guiteau sane. A very apt commentary on the psychiatric knowledge of himself and his confrères is to be found in the case

reported by Legrand du Saulle (*Gazette des Hôpitaux*, Sept. 11, 1883). An alienist was called on by two brothers. One went alone into the private office of the physician and said, concerning his brother, that while there appeared to be nothing the matter with him, he was no longer himself. After a long examination of the patient, the physician told the brother that the other brother was suffering from parietic dementia and would die in three or four years. The brother immediately placed an insurance of \$20,000 on his brother's head. The latter died in three years, and the company paid the policy. The second case shows that business men are, contrary to the opinion of many medical journals, not experts on insanity, and that their negative evidence is worthless. A French physician had had, for nine years, insurance on his life to the amount of \$20,000. He suddenly gave evidence of cerebral excitation, went and came without object, and wrote and spoke a great deal. He had an exaggerated opinion of his published works, and vaunted his professional skill. He one day accidentally encountered the director of the insurance company in which his life was insured, and, after a long conversation with him, said that the sum for which his life was insured was such a trifle, he must increase the amount to \$100,000. He was referred to the proper officials of the company, who consented. The papers were prepared, and only the signature of the unfortunate physician was wanting, when the latter spoke with such vehemence that the agent thought him drunk, and, under a technical plea, carried off the policy. The following day the unfortunate physician was sent to a hospital for the insane. Here he was found to be suffering from an advanced stage of parietic dementia, of which he died within six months. The company paid his widow the \$20,000, and thought themselves lucky that they had not to pay the \$100,000, for which the deceased had subscribed in a fit of pathological temerity, for he had done this in good faith and was far from foreseeing his sudden death.

HANDWRITING OF THE INSANE.—Dr. Bianchi (*Alienist and Neurologist*, October, 1883) comes to the following conclusions as to handwriting in its relations to the neuroses and psychoses: 1st. The study of the mechanical and psychical alterations of writing merits special attention, and may be of great utility in diagnosis, prognosis, and therapeutic direction. 2d. The reversed writing, it seems, may in future be studied with real advantage. Up to the present time it may be said that it is observed in many cases of right hemiplegia and idiocy. 3d. In mental diseases, especially, attentive examination of the psychical and mechanical alterations of the writing, may notably clear up the diagnosis of the disease. 4th. In prognosis, whether relative to an improvement or a relapse, examination of the handwriting may afford notable aid. 5th. The best treatment in cases of mechanical alteration of the writing is galvanization of the brain, good intellectual exercise, and a well-directed education of the hand. 6th. The specific treatment in

cases of altered writing from syphilitic cerebral lesions, and the use of strychnine in those from chronic alcoholism, give the best results.

IMMORAL CONDUCT AS A SYMPTOM OF PARETIC DEMENTIA.—In 1882 the New York State Medical Society, at the instigation of Dr. J. P. Gray, passed the resolution that the physician was not justified drawing conclusions from moral manifestations of conduct, that department belonging exclusively to law. It has been well said by Dr. Hughes, that it was an absurdity for medical societies to define the province of any department of science. The absurdity of such resolutions is shown by the following cases of immoral conduct ushering in paretic dementia, which are reported by Legrand du Saulle (*Gazette des Hôpitaux*, Sept. 11, 1883). A rich functionary was arrested in a shop at the moment while putting into his pocket without payment two porcelain articles of insignificant value. He was soon found to be a paretic dement. A highly respected notary, who had exercised his calling with honor for years, suddenly indulged in dishonorable practices, and was obliged to abandon his calling; he then became a wine merchant, ran through \$50,000 in eighteen months, and died a paretic dement. A cashier became careless, apathetic, neglected his accounts, and then "forced" them; began to frequent places of doubtful repute; stealing to fill his pocket-book. He died from one of the apoplectiform attacks so frequent in paretic dementia, and his family were obliged to repay his employers \$5,000 lost or taken by him. One case of stealing as a prodromic symptom of paretic dementia was reported in the JOURNAL OF NERVOUS AND MENTAL DISEASE, volume viii., and as Legrand du Saulle says, violations of public decency and outrages may also be prodromic symptoms of paretic dementia.

J. G. KIERNAN, M.D.

C.—THERAPEUTICS OF THE NERVOUS SYSTEM.

THE TREATMENT OF RHEUMATIC FACIAL PARALYSIS.—Dr. Moritz Meyer recommends a mode of treatment for this affection which, he claims, hastens recovery, which, according to Erb, is not the case with the ordinary mode of treatment. Meyer states that in almost every case which he has examined he has found, by pressing with his finger behind and beneath the ramus of the jaw, close to the foramen stylo-mastoideus, the nerve itself or the surrounding tissue swollen and painful. By comparison with the other side, this condition is easily made out. In these cases he applies at this spot some leeches and hot applications, and then, after a few days, the anode of the galvanic current of medium strength. After each sitting he is able to make out a diminution of the exudation, and a corresponding increase of motility, and,

finally, a cure is more rapidly attained.—*Berlin. klin. Wochen.*, 1884, No. 5.

SNAKE-POISON AS A REMEDY FOR TETANUS.—This rather heroic treatment was employed by Dr. A. O. Ameden, after the usual remedies had failed, in an aggravated case of tetanus following a wound of the foot. It occurred to Dr. Ameden that the physiological effects of rattlesnake-poison would be antagonistic to tetanus. Accordingly, living in a neighborhood where rattlesnakes abound, he had one caught and killed, and obtained some fresh poison from the gland. With this the point of a hypodermatic needle was moistened, and a puncture made in the back. Symptoms of snake-poisoning rapidly followed, with a decided amelioration of the tetanic spasms and rigidity which entirely ceased at the end of ten hours, and the patient was able to sleep for six hours. Thirty hours later, rigidity with slight spasm returned, and a second puncture was made. The spasms then entirely ceased and did not return, but the prostration of snake-poisoning became very marked and required active treatment. No local effects about the wound occurred. Recovery took place. Considering the failure of all other means in this case the effect was striking.

Dr. A. thinks that the poison (crotaline) can be used with comparative safety, but we should want to be sure of our prognosis before resorting to such heroic treatment.—*Med. News*, Sept. 29, 1883.

A CASE OF TRAUMATIC TETANUS TREATED WITH CURARE.—Dr. Ed. Gontermann reports a severe case of tetanus which recovered under this treatment. Chloral had been given without effect. Curare was then given subcutaneously in doses of 0.25–0.75 of a two-per-cent. solution. At first, after each injection, severe opisthotonos and extreme cyanosis resulted. After the second injection, the patient slept better, and, after a time, the injections being repeated, the spasms diminished and then ceased.

Gontermann insists that the drug must be freshly prepared, as it spoils on being kept, and should be first tested on animals before being used.—*Berlin. klin. Wochen.*, 1883, No. 44.

FUNCTIONAL SPASM OF THE STERNO-CLEIDO-MASTOID AND TRAPEZIUS, TREATED WITH STATICAL ELECTRICITY BY DR. DUBRUEIL.—The patient was first treated with statical electricity combined with general treatment (bromide of potash, douches, etc). The statical electricity, after two sittings, produced only an exaggeration of the symptoms; and, accordingly, the galvanic current was substituted for eight days without benefit. Regimbeau, to whom the patient had been entrusted, determined to return to, statical electricity. Improvement immediately set in, and the

patient, who had entered the hospital May 2d, was able to leave completely cured on June 25th. The electricity was applied three times a week, for half an hour at a sitting, in the following manner: Three electrodes were used, one being placed over the upper region of the neck behind, the second over the side of the neck, and the third over the lower part of the sterno-cleido-mastoid muscle. After each sitting the stiffness was increased, but this wore off at the end of an hour. At the end of eight days the shoulder had completely returned to its normal position, and the patient was able to hold his head straight and turn it completely to the right.

The success of this treatment is interesting, considering the insufficiency of almost all other methods of treatment, including galvanism, and may turn out to be of more extended practical value.—*Rev. des sciences médicales*, 1884, No. 45.

A SIMPLE OPERATION FOR FACIAL NEURALGIA.—Dr. J. F. Heustis reports a case of facial neuralgia which is of interest from the simplicity of the operation employed with success. It is described as follows:

A. E. L., an old gentleman, past seventy, of fine constitution and very healthy in every respect, except being a sufferer from *tic-douloureux*, has consulted me several times in the last year for his complaint, and has taken the various remedies likely to benefit him, with very little relief. As he continued to suffer more and more, I advised him to let me operate on him as the only means of relief. But the neuralgia being general, affecting the branches of both the supra- and infra-orbital nerves, I could not promise him with entire confidence that an operation on the infra-orbital nerve would be sufficient, although that seemed to be most affected. The pains would dart all over the side of the head and face at the least touch, even of a hair of the head or beard, or from the impression of a breath of air, or even from the movement of the jaws in mastication. His suffering became so great and constant, and the neuralgic attacks so severe from attempts to eat, that he began to run down from sheer exhaustion from want of food, and pain.

He was so weak at the time of operation, that it was a very important matter at his advanced age to make the operation as simple as possible, consistently with the hope of permanent relief. Therefore, discarding Carnochan's operation of trephining the antrum and following up the nerve beneath the orbit, and removing it; and Langenbeck's slighter one, of dividing the nerve far back in the orbit with a tenotome, and drawing it out through the infra-orbital foramen, I merely cut down upon the infra-orbital foramen, and with a fine steel drill, such as dentists use, improvised of piano wire, drilled out the nerve in its entire length, as far back as the sphenomaxillary fissure. The immediate effect of the operation was to abolish all sensation in the previously sensitive parts, and to enable him to use his jaws without suffering the

darting pains he formerly had. And not only was the sensitive-ness of the face relieved, but also that of the side of the head, showing that the trouble was in the distribution of the infra-orbital nerve, and that the affection of the branches of the supra-orbital was a reflex one. Barring some swelling of the face, he had no trouble afterward. The wound soon healed, and he had been able to expose himself to the air, and eat with impunity, and now, although nearly two months have elapsed, he remains free from pain and is enjoying excellent health.—*Med. News*, Dec. 8, 1883.

THE TREATMENT OF NEURALGIA BY INJECTIONS OF OSMIC ACID.—A. Eulenburg (Berlin) was induced by the results obtained by G. Neuber to try this method on a larger scale. Delbastaillé had previously employed parenchymatous injections of osmic acid in the treatment of tumors (especially sarcomata and scrofulous lymphomata). Neuber later used similar local injections in three cases of severe obstinate neuralgia, one of trigeminal and two of sciatica. All three were cured. Eulenburg used the injections in twelve patients, which were mostly fresh and not unusually severe cases, and included neuralgias of the upper and lower extremities, of the head and lumbar region. The time during which the treatment was continued was from one to six weeks. The number of injections in each case varied from three to fourteen; the total number of injections, eighty-two. The injections were made into the neighborhood of the diseased nerve, if possible in the connective tissue surrounding the nerve. Of the twelve cases only three were considered cured—no return of the pain in from two to fourteen weeks; four were somewhat improved; five unaffected. The usual dose was .005 gm.

In a second series of seventeen cases the result obtained was about the same, viz.: four cured (sciatica, 2; lumbar, 1; intercostal, 1).—*Berlin. klin. Wochen.*, 1884, No. 7.

THE EFFECT OF THE MAGNETO-ELECTRIC CURRENT UPON DEGENERATED NERVES AND MUSCLES.—A. Eulenburg has also studied the effect of the magneto-electric current as compared with the ordinary faradic (voltaic) current. In ten cases which showed simply *quantitative* (diminished) changes to both the faradic and galvanic current, he found that the reaction to the magneto-electric and the faradic (voltaic induced) for both nerves and muscles was exactly similar.

Also in three cases showing quantitative and qualitative alterations (reaction of degeneration) the behavior to the magneto-electric and the faradic currents was the same. In the fourth case, on the other hand, a difference was observable. The case was one of severe facial paralysis, with exaggerated reaction of degeneration. After about seven months regeneration set in, contrary to expectation. The reaction to the galvanic current had already changed for the better, and the trunk of the facial nerve gave a slight reaction to the faradic current. The muscles, on the

other hand, gave not a trace of reaction to the latter current. A month later, these conditions remained the same, but on applying the magneto-electric current it was found that both nerves and muscles plainly responded, although the contractions were weaker than on the sound side. Ten days later, the first trace of contraction appeared with the ordinary faradic current.

Eulenburg concludes "that in general the irritability for both the magneto-electric and voltaic-electric (induced) currents is the same, but that in individual cases the irritability of degenerated muscles returns earlier for the magneto-electric than for the voltaic-electric current, and possibly for the former later lost (?)."

The use of the magnetic current might in some cases be turned to practical advantage. At any rate the subject deserves further study.—*Neurologisches Centralblatt*, 1884, No. 3.

STATIC ELECTRICITY IN MYALGIA.—Dr. Andrew Heermance Smith recommends this form of electricity as being particularly efficacious in muscular rheumatism. He reports several cases, acute and chronic, which were cured by one or more sittings.—*Archives of Medicine*, April, 1884.

NERVE-STRETCHING FOR THE RELIEF OF PAIN.—A lecture lately delivered by John Marshall (*British Med. Jour.*, Dec. 15, 1883) contains some valuable information on this subject, gathered from various sources, and gives a good *résumé* of the subject. Marshall inquires: First, how far can a nerve be palpably stretched? Second, how much weight will a nerve bear? Third, the effect of stretching on the structure of the nerve. Fourth, the physiological effects of stretching. Fifth, are the mechanical effects of stretching transmitted to the spinal cord? Sixth, the therapeutic effects.

To the first question he answers that nerves are extensible to a certain degree, but to a much slighter extent than would be imagined,—not as extensible as arteries, but more than tendons. After being stretched, a nerve, by virtue of the elasticity of its sheath, recoils to near its original length. A nerve, *e. g.*, that has been stretched $\frac{1}{4}$ of its length recoils to $\frac{1}{40}$. A living nerve is more elastic than a dead one.

The breaking-weight varies with different nerves, according to their size, and has been found to differ extraordinarily with different experimenters. For the sciatic (after death) the lowest weight given is 82 pounds, and the highest 288 pounds (Trombetta). Stintzing found, as a result of experiments on living animals, that the great sciatic will bear 1.8 of the body-weight. Hence, taking the average weight of the human body at 150 pounds, the great sciatic will bear 83.3 pounds.

The safe strain for a healthy sciatic (man) may be reckoned at 60 pounds; for a diseased sciatic, 30 pounds.

The structure of the nerve is profoundly altered. The motor properties and the sensory properties are both of them diminished,

though the sensory are not so intensely affected as the motor. The reflex functions, curiously enough, are not so suddenly affected as either the motor or the sensory, while the irritability, *i. e.*, its power of conducting impressions, is increased by moderately strong pressure, and is only diminished when the tension is made very great.

In regard to the fifth question, the results of experiments have shown that while the spinal ganglia and sheaths of the roots may be mechanically moved, the cord itself is not disturbed.

From an analysis of 252 cases, Marshall concludes that nerve-stretching is best adapted for the cure of neuralgia, in which the successes are very great. Out of 168 cases of neuralgia of all kinds in which the operation was done, 142 successes (including sixteen partial) are recorded, twenty-four failures (seven doubtful), and two deaths.

The subcutaneous or "bloodless" operation is recommended as worthy of a trial. Horsley has found that he can stretch the sciatic on the dead body by this method, while among others, Lange, Trombetta, Stintzing (and it may be added Lepinè and Shrady) have employed it for the relief of pain, and obtained satisfactory results.

It certainly should be tried before resorting to the cutting operation. No evil results follow this method, which is performed as follows: The patient is etherized, and the thigh is forcibly flexed upon the abdomen, the leg extended, and the foot flexed on the leg. The pressure should be firm and kept up for five minutes.

That nerve-stretching may not be entirely free from danger is shown by the following case reported by C. Westphal (*Centralblatt f. Med. Wissenschaften*, 1883, No. 48), who cut down upon and stretched the right sciatic to relieve symptoms of spastic paralysis. These symptoms were relieved upon the side operated upon, but there ensued permanent incontinence of urine and fæces, contraction of legs, and extensive decubitus. These symptoms gradually increased, hemianæsthesia and ataxia developed, and death occurred three years after the operation. Autopsy: Small patches of degeneration in the brain, pons, and medulla; diffuse degeneration in the cervical and dorsal spinal cord, and multiple centres of degeneration in the right half of the lumbar cord. Westphal thinks that the last were due to direct injury of the cord by the operation.

REFUSAL BY THE INSANE TO TAKE FOOD.—F. Siemens disparages forcible feeding of the insane. He thinks the dangers of fasting to such patients not so great as is generally supposed. The abstinence from food in most cases depends upon disturbances of innervation and tissue metamorphosis, and consequently only a symptom of a morbid bodily condition. Therefore feeding should no more be compulsory with the insane than with the sane who suffer from similar bodily conditions. With the insane the retardation of tissue metamorphosis gives to the body the capacity to do with little food.

The danger to such as refuse to take food from purely psychical causes (delusions) is not great, so long as the fast does not last over fourteen days without water, or over fifty days with water, and so long as not over forty per cent. of the body-weight is lost.

A peculiar fetor of the breath is noticeable during the fasting condition. The same odor is possessed by the urine, which also gives a reaction which has been much described of late, namely, a red color with chloride of iron. The best treatment, S. maintains, is to train such patients to take their food of their own accord, and to regularly set food before them, so that the need of it may be satisfied when the time comes.

A number of illustrative cases are given, including one where the fast lasted thirty-three days without injury.—*Neurologisches Centralblatt*, 1884, No. 6.

ERYTHRINA CORALLODENDRON IN MENTAL DISEASES.—Rey has experimented with this drug in a variety of mental affections, and found that in the majority of cases its action was quieting and hypnotic. Its most remarkable physiological effect is slowing of the pulse from eight to sixteen beats in the minute. In the maniacal excitement of general paralysis it has no effect. It deserves further trial.—*Annales méd. psychol.*, Sept., 1883.

MANIACAL DELIRIUM TREATED BY THE COLD DOUCHE.—Dr. Thomas Barlow reports a case of what was probably exaggerated delirium tremens, probably also complicated with pleuro-pneumonia. The patient had not slept for three nights and four days, and was so wild that no examination could be made. Large doses of chloral, bromide, and morphia had been given without effect, and Dr. Barlow determined to try the plan recommended by Dr. Broadbent (*Lancet*, March 24, 1883). The patient was stripped and a spongeful of cold water squeezed down his neck and back, and then freely splashed over his face and chest. It quieted him immediately. He said it was nice, and was well pleased to have it repeated. He was then vigorously rubbed and dried, and strong broth given. He slept four hours, and then woke and was violent again. He was douched again as before, and once more lay down and slept quietly. No delirium after this. A good recovery was made, notwithstanding a slight attack of pleuro-pneumonia which Dr. Barlow thinks existed before the cold water was used.—*Lancet*, Jan. 5, 1884.

THE USE OF HYOSCYAMINE IN THE TREATMENT OF MENTAL DISEASES.—Dr. Metcalf, Superintendent of the Kingston Asylum, in a paper read before the Canada Medical Association, recommends subcutaneous injections of hyoscyamine in acute mania. The full hypodermatic dose for an adult male is $\frac{1}{10}$ grain, for adult female $\frac{1}{12}$ grain, given once a day. The full physiological effects are produced. Thus given it acts in about twenty minutes. He gave in detail the history of numerous cases of acute mania, in

which the attack was cut short by the use of the drug. In cases where it failed to cut short the attack it usually ensured a good night's sleep, and no ill effects followed.

Dr. Hurd added his testimony to that of Dr. Metcalf as to the benefit from the drug in acute mania, and also in melancholia. In the latter disease he gives $\frac{1}{48}$ to $\frac{1}{20}$ grain by mouth. Would not give it in fatty degeneration of the heart.—*Canada Med. and Surg. Jour.*, Sept., 1883.

EXPERIMENTAL RESEARCHES ON THE HYPNOTIC AND SEDATIVE ACTION OF PARALDEHYDE.—Prof. Morselli, of the Royal Asylum of Turin, publishes the following statements in regard to the use of paraldehyde as an hypnotic in mental disease. He has administered it about 350 times in various forms of insanity, and finds it more especially useful in the more active types of the disease (mania), while the more depressed conditions (melancholia) are less affected by an equal dose. In all cases where it acts it produces a refreshing sleep, and it is quite free from the disadvantages attached to chloral hydrate. Unlike the latter, it is not contra-indicated by morbid conditions of the circulation and respiration.

The dose recommended is about three grammes, which in most insane patients is sufficient to produce an uninterrupted sleep of from four to seven hours' duration. The author does not state whether the patients gradually accustom themselves to the drug as to most other sedatives or how long it retains its original effect.—*Gazzetta degli Ospitali*, Jan. 14-17-21, 1883, Nos. 4, 5, and 6.

THE OPIUM HABIT: ITS SUCCESSFUL TREATMENT BY THE AVENA SATIVA.—In a paper originally read before the New York State Medical Society, and now published in pamphlet form, Dr. E. H. M. Sell reports some cases of opium habit treated by Avena Sativa. The cases are unfortunately very unscientifically reported, so that it is difficult to judge of the value of the treatment. In spite of this, Dr. Sell adduces some strong evidence in favor of the drug in two or three cases. The others are of no particular value. The preparation used is the concentrated tincture of Avena Sativa or common oats. In the same pamphlet Dr. Sell publishes a paper by Dr. H. H. Kane, who criticizes the treatment unfavorably, and states that he has used the drug in 29 cases in the De Quincy Home without any benefit whatsoever.

CYANIDE OF GOLD AND POTASSIUM IN THE TREATMENT OF OPTIC-NERVE ATROPHY OF TABES.—Galezowski has used with considerable success hypodermatic injections of cyanide of gold and potassium in a case of atrophy of the optic nerve, consecutive to syphilitic locomotor ataxia. The ataxia was stopped and the sight very sensibly improved. The dose employed was five milli-

grammes, afterwards increased to ten milligrammes, given every day or every other day. He gives, in response to inquiries, the following formula, which should be carefully prepared :

Cyanide of gold and potassium	20 centigrammes
Distilled water	10 grammes

A fresh solution is more active and less irritating than one which has been kept some time. The injections should be made by preference in the back along the spine. Care should be taken that they are made some distance from one another, and deep in the cellular tissue. If made in the skin itself they cause necrosis, abscesses, and phlegmonous inflammation. These accidents can be prevented if the directions given are followed.—*Gazette des hôpitaux*, 1884, pp. 11 and 227.

METALLO-THERAPY IN THE TREATMENT OF OCULAR AFFECTIONS.—Under this heading Drs. Arthur Johnstone and L. Webster Fox publish three cases of “hyperæsthesia of the retina,” but “complicated with neurotic symptoms.” This seems very much like the tail wagging the dog, as the first and third cases were undoubtedly general neurasthenia, and the second hysteria with hemi-anæsthesia, the eye symptoms being part of the general condition. However, the results obtained by the authors were striking and interesting, and suggest that metallo-therapy, whatever be its *modus operandi*, might be more extensively used than at present on this side of the water. The principal eye symptoms observed in all three cases (which it should be said were protracted chronic cases) were hyperæsthesia of the retina and hypermetropia. In the first two cases the defect of vision had been corrected by glasses without effect on the other symptoms. Accordingly resort was had to metallo-therapy, after Burq’s method. Complete success followed in all three cases.

The logic indulged in (for which not the authors but their “illustrious preceptor, Dr. Burq,” is responsible) is a curiosity in its way.

In the first case the patient was found “sensitive to *steel*,” and consequently, according to the logic of metallo-therapists, tincture of the chloride of iron was given internally. On what principle of philosophy this is founded it is difficult to imagine, but probably, like most philosophy, passeth understanding. However, the result was good, which is the main point. We suspect that this depended more upon moral influences than upon either the physical effect of steel or the chemical effect of its tincture. As the patient had previously been under the care of ten other oculists, and “at the hands of several went through thorough and varied courses of medication,” it would not have been superfluous to have mentioned whether *steel* in any of its compounds had been prescribed before, though an affirmative answer might have destroyed the delusion as to the method of cure in metallo-therapy.

The second patient was found sensitive to gold and accordingly treated, while the third was again treated with tinct. ferri chl.

MORTON PRINCE, M.D.

BOOKS AND PAMPHLETS RECEIVED.

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Clinical Aspects of Cerebral Syphilis. By Horatio C. Wood, M.D. Extract from the Transactions of the College of Physicians of Philadelphia. 1884.

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FOREIGN EXCHANGES.

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Virginia Medical Monthly.
Walsh's Retrospect.

Fig.1.

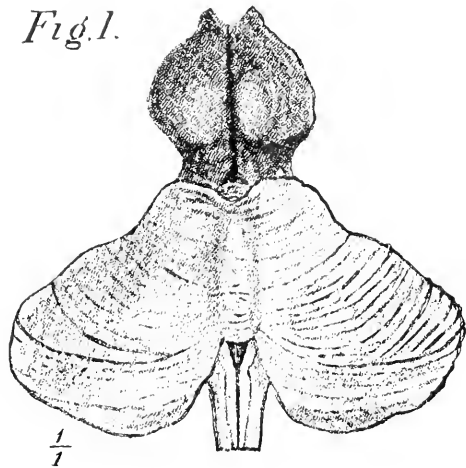


Fig.2.

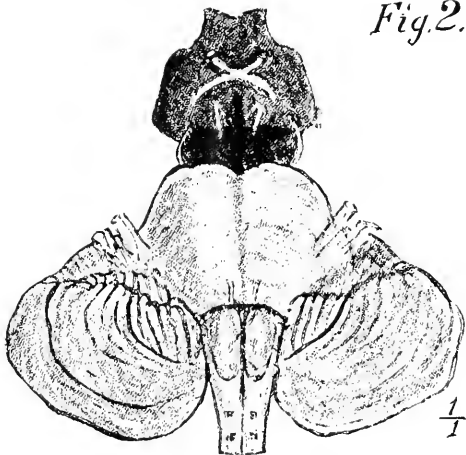


Fig. 3

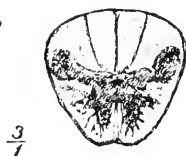


Fig.4

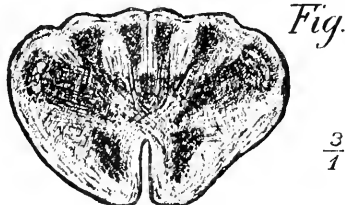


Fig.5

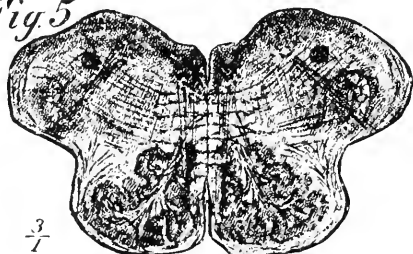


Fig.6

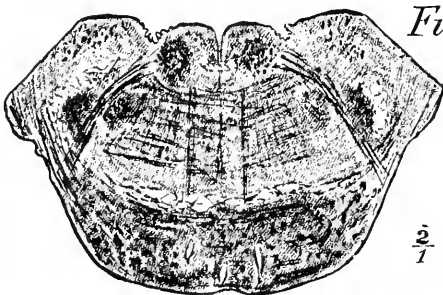


Fig.7

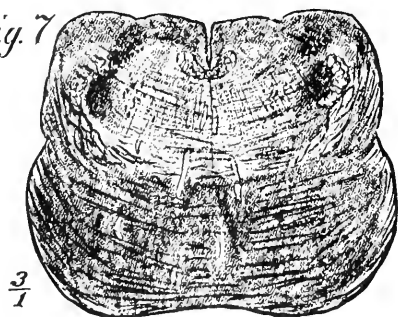
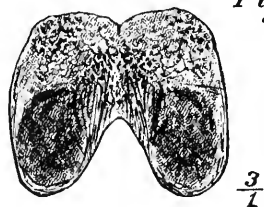


Fig.8



BRAIN OF MICROCEPHALIC INFANT.

THE
Journal
OF
Nervous and Mental Disease.

Original Articles.

THE SENSORY TRACT IN THE CENTRAL
NERVOUS SYSTEM.*

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IT is the object of this essay to determine the course of the tracts which convey general sensations from the surface of the body to the cortex of the brain, and to ascertain in what region of the cortex the sensations are consciously perceived. By the term general sensations it is intended to include tactile sensations, the sensations of pain and temperature, and the muscular sense. In order to determine the course of the tracts it will be necessary to trace the anatomical connection between the skin and the cortex of the brain as far as possible by the various methods at command. In order to ascertain the region of the cortex in which sensations are perceived the physiological experiments which have a bearing upon the subject will be reviewed, and the pathological cases in which sensory symptoms can be connected with localized disease will be cited.

I.—The anatomical connection between the surface of the

* An essay to which was awarded the Alumni Association Prize of the College of Physicians and Surgeons, May, 1884.

body and the cortex of the brain may be conveniently divided into four parts :

1. The peripheral nervous system, by which sensations reach the spinal cord.
2. The sensory tracts in the spinal cord.
3. The sensory tracts in the medulla, pons, and crura cerebri.
4. The sensory tracts in the brain.

1.—*The peripheral nervous system* requires but a brief mention since its anatomy is a subject remote from the present one. Sensory impressions are transmitted from the surface of the body to the spinal cord along mixed nerves made up of fibres which are partly sensory and partly motor. These nerves after passing between the vertebræ into the spinal canal divide into two divisions, one of which enters the spinal cord upon its antero-lateral surface, and the other of which enters it upon its postero-lateral surface. It was one of the early discoveries of nervous physiology, made independently by Magendie and Sir Charles Bell, that the anterior of these divisions contained all the motor fibres of the nerve, and that the posterior of these divisions contained all the sensory fibres of the nerve. It is, therefore, with the nerve-fibres entering the spinal cord by the posterior nerve-roots that this essay has to deal.

2.—*The sensory tracts in the spinal cord.*—At its point of entrance into the spinal cord each sensory nerve-trunk loses its sheath, and its separate fibres at once diverge in various directions. Two main divisions of the nerve are well marked. The first passes directly into the posterior gray horn. The second passes into the posterior lateral white column, and is the larger of the two.

(1) The nerve fibres entering the posterior gray horn at once diverge from one another. Some of these end in the small cells of the posterior horn. A part of these are lost in

the network of nerve fibres in the substantia gelatinosa. A part of these pass forward to the anterior gray horn of the same side. Others pass over to the gray matter of the other side through the posterior gray commissure. A considerable part pass forward and inward, and then turn upward in a bundle named by Kölliker the longitudinal bundle of the posterior horn, and by Clarke the ascending bundle of Deiters, and having ascended a longer or shorter distance again become horizontal and join gray cells in the posterior horn.

(2) The nerve fibres entering the posterior median white column divide into: (a) a small bundle which turns downward, and having passed from one to three centimetres in this direction, enters the posterior gray horn¹; and (b) a large bundle which turns upward, and in its course approaches the antero-lateral angle of the posterior column. This latter bundle sends out its fibres in various directions as it passes upward. Many of these fibres turn outward and enter the posterior gray horn at various levels. The remainder pass upward and are lost. The termination of those entering the gray horn is various. Some end directly in the small cells of the gray horn. Some pass forward to the anterior gray horn of the same side. Some terminate in the groups of cells lying in the posterior lateral part of the anterior horn. Some are lost in the network of Gerlach, in the region of the cells of the column of Clarke, and are doubtless connected with these cells. Many of the fibres pass by way of the posterior gray commissure to the opposite side of the cord, where they end in the gray network, or in the cells of the anterior horn.² The various cells in which these fibres terminate send out two or more protoplasmic

¹ Schultze: *Arch. f. Psychiatric*, xiv., 2. Ueber secundären Degeneration im Rückenmarke.

² Flechsig: "Leitungsbahn im Gehirn u. Rückenmark," 1877. Schwalbe: "Neurologie," 1881. Ross: "Diseases of Nervous System," Anat. introduction (1883).

prolongations and these in turn uniting make up a complex network throughout the gray substance of the cord.

Thus all the nerve fibres entering by one nerve-trunk terminate in the gray matter of the cord.¹ The level of their terminal cells is not that of their entrance, but each spinal nerve is connected with successive layers of the gray matter from a point three cm. below its entrance to a point at least eight cm. above and possibly higher.³

From the cells in the gray matter and from the network of fibres new nerve fibres arise which pass backward to the posterior median column, and form it. Some of these fibres come from the inner side of the posterior horns and from the network near the Clarke column of cells, and pass through the posterior lateral column to reach the posterior median column. Others come from the posterior commissure of the gray substance, and turning directly backward pass along the sides of the septum posterius and thus reach the median column.² This posterior median column is made up entirely of long fibres passing up to the medulla and conveying sensations from the lower extremities.³ The posterior lateral column below the cervical region contains chiefly short fibres passing from the nerve-trunks to the gray matter as already described; and possibly short fibres between adjacent segments of the cord. In the cervical region it also contains long fibres which pass up to the medulla—and which probably convey sensations from the upper extremities.³ The direct cerebellar columns, lying in the periphery of the lateral columns are made up of fibres which arise from the cells of the columns of Clarke—cells which are considered the terminal stations of some of the sensory fibres entering the posterior horn. These

¹ Hermann's "Handbuch. d. Physiol." Eckhard. P. 159.

² Flechsig: "Leitungsbahn im Gehirn und Rückenmark," p. 311.

³ Schultze: *Arch. f. Psychiatrie*, xiv., 2. Ueber secundären Degeneration. Flechsig: Plan des mensch. Gehirns.

columns were thought to convey sensory impulses by Meynert,¹ and the fact of their origin from sensory cells, proven by Flechsig,² is supposed to confirm this hypothesis, which is further strengthened by the fact that they degenerate upward (centripetally) after lesions in the cord.

It has been recently asserted that some of the sensory fibres in the cord pass upward in the portion of the lateral columns which lie between the gray matter of the cord and the direct cerebellar columns. (Pyramidenbahn and Seitenstrang reste.) This hypothesis is not proven, and the fact that in descending degeneration involving these columns after a lesion of the brain or upper cord, as well as in primary lateral sclerosis which affects these columns in their entire extent, all sensory symptoms are wanting, seems to oppose the hypothesis.

Anatomical study therefore indicates that in the spinal cord the sensory tracts lie in :

1. The gray matter of the cord ;
2. The posterior median and posterior lateral columns ;
3. The direct cerebellar columns.

Physiological experiment and pathological study have shown that sensory impressions pass immediately, after their entrance into the cord, to its opposite side, at least partially if not wholly.³ The decussation of the fibres conveying sensations of pain and temperature along any nerve occurs at a lower level than that of the fibres conveying tactile sensations.⁴ The fact that the sensations of pain and temperature may be lost while those of tactile sensations are unaffected,⁵ and the fact that tactile sensation may be impaired while sensations of pain and temperature

¹ Meynert : *Arch. f. Psych.*, iv.

² Flechsig : " *Leitungsbahn*," p. 299.

³ Hermann's " *Handbuch d. Physiol.*," p. 167.

⁴ Köbner, *Arch. f. klin. Med.*, xix., 169, art. on Spinal Hemiplegia—forty-eight cases.

⁵ Bernhardt, *Berlin. klin. Wochenschr.*, Jan. 24, 1884.

are normal,¹ indicates that these two classes of sensation are transmitted along different tracts in the spinal cord in man. In animals sensations of pain and temperature are transmitted upward through the gray matter of the cord; and tactile sensations are sent along the posterior white columns.² It is probable that the same is true in man, but this is not yet proven, as it is possible that in disease of the cord in man sensations may pass upward through the gray matter, which would normally go along the posterior columns.³

It may therefore be stated that the various functions of the various sensory tracts is not absolutely determined in man. It is known that a unilateral lesion of the cord in man produces a loss of muscular sense on the side of the lesion, and a loss of the sensations of touch, pain, and temperature on the side opposite to the lesion.⁴ It is also known that sclerosis of the posterior lateral columns, which involves the fibres of the sensory nerves entering the cord through them, produces disturbances of the sensations of touch, pain, and temperature, as well as a marked disturbance of the muscular sense. Such a sclerosis is followed after a time by secondary scleroses in the posterior median and direct cerebellar columns, but it is as yet impossible to distinguish the symptoms due to each of these processes. After a transverse myelitis from any cause a secondary degeneration upward of the sensory tract occurs, the process advancing up to the medulla in the posterior median and direct cerebellar columns and for several centimetres up-

¹ Schüppel, *Arch. f. Psych.*, ix.

² Schiff, "Physiologie"; confirmed by M. Foster and Dalton.

³ Wundt, "Physio-Psychol.," pp. 107-110; also Hammond, Case of Allochiria, N. Y. Neuro. Soc. Trans., Jan., 1883; and cases of allochiria in *Brain*, vol. iv., No. 2, vol. v., No. 3.

⁴ Brown-Séquard, *Arch. de Physiol.*, 1868; Köbner, *Arch. f. klin. Med.*, xix., where forty-eight cases with autopsies are collected. Brown-Séquard considered that the muscular sense was transmitted through the motor columns of the cord, but more recent investigation has demonstrated the existence of sensory nerves from the muscles which enter the posterior columns, and are therefore in connection with the sensory tracts.

ward in the posterior lateral columns,¹ and when this is total all sensations are cut off from below. When the process is only partial, however, sensation is but slightly affected, if at all; though whether this lack of symptoms is due to the escape of some white fibres in the degenerated columns, or to a vicarious action of the gray matter, is undecided, although the former is probably the case.

None of the pathological processes in the spinal cord which affect the sensory tracts afford a basis for distinguishing between the functions of these various tracts. The only conclusions possible in the present state of knowledge are :

(1) In the spinal cord sensory impressions are transmitted through the posterior median and posterior lateral and direct cerebellar white columns, and through the gray matter.

(2) All sensory impressions except those of muscular sense decussate in the cord soon after their entrance to a great degree, if not wholly.

3.—*The sensory tracts in the medulla, pons, and crura cerebri.* On reaching the medulla the sensory tracts of the cord undergo changes of direction and division which are difficult to trace. It is impossible to rely solely upon any single method of determining their course. A number of methods, however, are at present used to trace the direction of a nerve-tract. These are as follows :

(1) By means of a series of thin continuous sections, sagittal, horizontal, and vertical, the continuity of fibres can be followed.

(2) As the medullary sheaths of the fibres of each tract develop in the fœtus at various times, their presence or absence in a definite area, in fœtuses of various ages, affords valuable information regarding the course of the tracts.²

¹ Schultze, *Arch. f. Psychiatrie*, xiv., 2, Über secundären Degeneration ; and Homen, *Virchow's Arch.*, Sept., 1882.

² Known as Flechsig's method.

(3) If a definite tract be divided in a new-born animal, and it survives the operation, the parts connected with that tract fail to develop as the animal grows, and hence a *post-mortem* examination of the full-grown animal will reveal an atrophy in the course of the tract, formerly divided, whose course it is desired to trace.¹

(4) A local focus of disease in any nerve-tract is followed in the course of a few weeks by a process of degeneration in that tract, which probably proceeds in the direction in which normal nerve impulses are sent. Hence, some time after a lesion, the tract leading from that lesion may be distinguished from all other tracts by the condition of degeneration.

(5) By collecting a large number of cases of local lesion limited to a small area of the nervous system, and ascertaining the symptoms common to all these cases, valuable positive information regarding the function of the area involved by the lesion is afforded. The evidence thus obtained may be tested by a second collection of cases of local lesion involving all other parts of the nervous system excepting the area concerned in the first set of cases, and observing in these the function which remains unaffected. If the facts afforded by the positive cases are substantiated by those obtained from the negative cases, they may be considered as established upon a firm basis.

It is by the use of all these methods, and by a selection of the common facts established by them, that we shall attempt to determine the course of the sensory tracts in the medulla, pons, and crus.

(1) The continuity of the sensory tracts of the cord, with certain parts of the medulla, is easily ascertained, and is not a matter of dispute. All authorities admit, that the posterior median column (the column of Goll) terminates

¹ Known as Gudden's method.

in the funiculus gracilis of the medulla, and its fibres enter the cells of the nucleus gracilis. The posterior lateral column (the column of Burdach) terminates in the funiculus cuneatus and its nucleus, which lies just external to the funiculus gracilis. The direct cerebellar column of the cord passes directly to the cerebellum, by the way of the corpus restiforme of the medulla, the column lying just external to the funiculus cuneatus. The gray matter of the cord undergoes a change of form and of location in becoming continuous with that of the medulla. Each posterior horn becomes greater in area at its extremity, and smaller in area at its junction with the central gray matter, and finally its extremity is separated from the central gray matter by a set of white fibres which come from the nucleus cuneatus and nucleus gracilis, and pass inward toward the median line. While this change of form is proceeding, the location of the posterior horn is also changed. It is displaced laterally by the constantly increasing size of the parts lying between it and the median fissure, and later by the gradual opening out of the central canal into the fourth ventricle by means of the separation of the sides of that fissure. Thus it comes to lie in the lateral part of the medulla, a little posterior to a horizontal line through its centre. The microscopic appearance also changes. Instead of a compact mass of small gray cells in the cord, lying in a fine network of fibres, the sensory gray of the medulla presents the appearance of scattered gray cells lying in a coarse network of fibres. These fibres are partly protoplasmic prolongations of cells, and partly distinct white fibres passing in all directions. The appearance of this area in the medulla has been described by the name which it bears—viz.: the *formatio reticularis*. In the lower part of the medulla, therefore, the sensory tracts on each side consist of three gray col-

umns—the funiculus gracilis, the funiculus cuneatus, and the formatio reticularis; and a single white tract—the direct cerebellar column. The latter passes out of the medulla by the inferior peduncle of the cerebellum, and terminates in the cortex and central gray matter of the vermiform lobe of the cerebellum. It does not enter into the description of the sensory tracts above this level, and will therefore be traced separately further on. The course of the sensory impulses from the three gray columns upward through the medulla and pons is still undetermined, since irreconcilable differences exist between the various anatomists who have studied the subject. The following views have been advanced by different authorities:

MEYNERT¹ traces fibres from each nucleus gracilis and nucleus cuneatus (1) to the olivary body of the same side, where fibres arise which cross to the opposite side and go to the cerebellum through the corpus restiforme; (2) through the sensory decussation to the opposite side of the medulla, where they turn upward in the interolivary tract, lying adjacent to the raphé and dorsad to the pyramidal tract. These fibres pass up through the pons, lying just dorsad to the pyramidal tract, and in the crus they divide, some ending in the substantia nigra, and some going to the external third of the longitudinal bundles of the pes of the crus, and thence to the posterior part of the internal capsule. He states that the outer part of the formatio reticularis, in which lie the sensory roots and cells of the V., and VIII., and IX. nerves, is homologous to and a continuation of the substantia gelatinosa of the posterior gray horns of the cord below, and is continuous above with the formatio reticularis lying external to the red nucleus of the tegmentum of the crus, whence fibres ascend to the posterior part of the internal capsule, and to the optic thalamus.

FLECHSIG² traces (1) fibres from the nucleus gracilis through the upper decussation to the opposite interolivary tract, in which they ascend and then pass to the lateral part of the lemniscus, in which they go upward between the corp. quad. and the red

¹ Stricker's "Handbook of Histology," Sydenham edition, vol. ii., p. 525. *Arch. f. Psych.*, iv., p. 405.

² Flechsig: "Leitungsbahn im Gehirn und Rückenmark," 1876. *Arch. f. Heilkunde*, xviii., p. 280, 1877. "Plan des menschlichen Gehirns," 1883, pp. 21, 22. *Arch. für Micro. Anat.*, xix., p. 60, 1881.

nucleus to the posterior third of the internal capsule. (2) Fibres from the nucleus cuneatus (α) to the olivary body of the same side, which is connected (α) with the lemniscus of the same side, and (β) with the cerebellum of the opposite side; (β) to the formatio reticularis of the same, and possibly to the opposite side, whence fibres pass both to the optic thalamus and to the cortex through the internal capsule. He considers the lemniscus and the formatio reticularis as the direct continuation of the posterior columns of the cord, and opposes the view which connects these columns with the cerebellum. With the formatio reticularis are also continuous the gray matter of the posterior horns of the cord and the white fibres lying adjacent to it (*Seitenstrang reste*).

ÆBY¹ traces (1) the fibres from the nucleus gracilis through the upper decussation into the interolivary tract, thence through the lemniscus to the optic thalamus; (2) the fibres from the nucleus cuneatus to the olivary body of the same side, thence to the corpus restiforme of the opposite side, and in it to the cerebellum, whence they issue again in its superior peduncle, and decussating a second time below the red nucleus end in it or in the optic thalamus above.

ROLLER² considers the interolivary tract and its continuation upward in the lemniscus as the chief sensory tract of the medulla and pons, and traces to it fibres from both the nucleus gracilis and nucleus cuneatus of the opposite side, and fibres from the olivary body of the same side, with which both the nuclei of the same and of the opposite side are joined. The lemniscus does not decussate in the crus, but passes directly to the posterior part of the internal capsule, and to the optic thalamus.

HENLE³ describes a second decussation of the lemniscus in the crus in the roof of the aqueduct of Sylvius, a view with which the description of Wernicke is in accord. Henle does not attempt to trace each tract of the cord to the brain.⁴ He states that the greater part of the posterior columns of the cord join the anterior column of the medulla and thus ascend, a position in which he stands alone, and which has never been confirmed.

SCHWALBE⁵ says that a connection of the nucleus gracilis and

¹ Æby: "Schema des Faserverlaufes im Gehirn u. Rückenm." Bern, 1883.

² Roller: "Die Schleife." *Arch. für Micro. Anat.*, xix., 2, p. 303.

³ Henle: "Handbuch der Nervenlehre," 1879, p. 272.

⁴ *L. c.*, p. 329.

⁵ Schwalbe: "Lehrbuch der Neurologie," 1881, p. 633.

nucleus cuneatus, with the formatio reticularis and olivary body, though probable is not proved, and that their connection with the cerebellum is very improbable. He considers the formatio reticularis as the continuation of the *seiten strangeste*, and traces its fibres to the optic thalamus. He does not trace a sensory tract directly from the cord to the brain, but confines himself to a review of other anatomists, preferring to leave the question undecided.

WERNICKE¹ has given the subject most careful study, and come to the following conclusions. Since the sensory impulses cross the median line in the cord soon after their entrance, and since lesions of the cord or of the internal capsule produce hemianæsthesia of the opposite side, the sensory tract in one side of the cord must be continuous with the internal capsule of the same side. Therefore there is either no sensory decussation in the medulla or there is a double sensory decussation between the spinal cord and the internal capsule. If the first alternative is adopted the sensory tract must lie in the medulla in the external lateral part of the formatio reticularis. This conclusion is reached by a process of exclusion, the function and connection of all other parts being distinctly non-sensory, except the lemniscus, which, however, cannot be included as it decussates. But Wernicke has observed a case of tubercle of the pons,² situated just in the external lateral part of the formatio reticularis in which no anæsthesia of the parts below was produced. He therefore rejects this alternative, and adopts the second one, according to which a double decussation of the sensory tract occurs between the cord and capsule. This double decussation he traces as follows :³

A. Fibres from the nucleus gracilis cross in the upper or sensory decussation to the interolviary tract and lemniscus, ascend in it to the roof of the aqueduct of Sylvius beneath the corpora quadrigemina, where they recross (in the decussation described by Henle), and then pass up into the internal capsule, and to the optic thalamus.

B. 1. Fibres from the direct cerebellar tract of the cord pass along the inferior cerebellar peduncle to the vermiform lobe of the cerebellum where their first decussation occurs.

2. Fibres from the nucleus gracilis pass along the inferior cerebellar peduncle of the same side to the vermiform lobe where their first decussation occurs.

¹ Wernicke : " *Lehrbuch der Gehirnkrankheiten.*" Bd I., 1881.

² *Arch. f. Psych.*, vii.

³ I reverse the order in which he states the facts, in order to trace the tracts from below upward in the direction in which they transmit impulses.

3. Fibres from the nucleus cuneatus pass to the olivary body of the same side, thence by the fibræ arcuatæ to the inferior peduncle of the opposite side, thus reaching the dentate nucleus of the cerebellum.

The fibres then issue from the cerebellum by two paths: (1) by the middle peduncle, when they recross in the pons and turn upward in its anterior part to pass into the outer third of the pes of the crus, and thence reach the internal capsule; (2) by the superior peduncle, when they recross in its decussation below the red nucleus, and, passing around or through this, reach the internal capsule.

The last authority to be mentioned is SPITZKA,¹ whose description of the sensory tract agrees in some points with that of Meynert and in some with that of Wernicke. He holds that the fibres from the nucleus gracilis pass through the sensory decussation of Meynert to the interolivary tract of the opposite side, and thence in the stratum intermedium (a term which Spitzka applies to the longitudinal fibres of the pons lying just posterior to the pyramidal tracts, and which is the same as Henle's *Bundle vom Fuss zu Haube*, and which is continuous with Meynert's stratum intermedium at the level of the substantia nigra of Sömmering) to the posterior part of the internal capsule, thus forming a direct sensory tract to the cerebrum.² He holds that the fibres from the nucleus cuneatus divide into a larger and a smaller set of fibres. The larger set decussates through the olivary bodies, and thence passes to the cerebellum by way of the restiform column. The smaller set does not decussate, but passes to the inner portion of the restiform column of the same side, forming the inner division of the inferior peduncle of the cerebellum, and terminating in the nucleus fastigii.

The direct cerebellar column joins the restiform column, and thus represents a direct uninterrupted communication between the sensory periphery and the hemispheres of the cerebellum. The restiform column of each side is therefore made up of (1) the direct cerebellar column of the same side; (2) a part of the column of Burdach of the opposite side, whose fibres have passed through

¹ The Relations of the Cerebellum, *Alienist and Neurologist*, Jan., 1884. Case of Pons Lesion, *Amer. Jour. of Neurology*, Feb., 1884.

² Spitzka does not seem to notice what Wernicke pointed out, that, if such were the course of the sensory tract conveying tactile sensations, a lesion of the internal capsule would produce anæsthesia on the *same* side of the body as the lesion. For the sensory impulses along such a tract would have crossed once in the cord and a second time in the medulla, thus regaining the side they came from.

the olivary bodies ; (3) a part of the column of Burdach of the same side. The restiform column goes to the cortex of the cerebellar hemisphere, and a small portion of it to the nucleus dentatus of the cerebellum. From these parts new tracts issue which convey sensory impulses to the cerebrum. The first of these tracts is the middle peduncle of the cerebellum, in which fibres pass from the hemisphere of the cerebellum to the pons of the opposite side, end in the gray matter of the pons, and thence go up by new longitudinal fibres in the pons, which pass into the pes, and thus to the internal capsule. (This corresponds to Wernicke's first recrossing tract.) The second of the tracts passes from the nucleus dentatus of the cerebellum along the superior peduncle to the red nucleus of the opposite side, and thus into the internal capsule. (This corresponds to Wernicke's second recrossing tract.) Spitzka holds that the cerebellum is a special cerebral segment for all the sensory tracts, into which they are temporarily deflected on their way to the cerebrum. He therefore favors the view of Wernicke as to the existence of a double decussation between the cord and the capsule for all fibres excepting those of the column of Goll. Spitzka, therefore, traces two distinct sensory tracts from the cord to the brain. One of these goes directly through the interolivary tract, stratum intermedium, crus, and internal capsule to the cortex. The other is deflected to the cerebellum, and, having decussated twice between the lower level of the medulla and the level of the red nucleus, reaches the internal capsule and joins its fellow. The first of these corresponds to Meynert's tract. The second of these corresponds to Wernicke's tract.

It is evident that the different views here stated cannot be reconciled. It is also evident that the method of tracing fibres followed by these anatomists is inadequate to decide between their differences. The actual course of the sensory tracts must be traced by the aid of other methods.

(2) The method of Flechsig gives little satisfactory information as to the sensory tracts, as he himself admits, and the conclusions reached by him are based largely upon the results of pathological study. They have been already stated.

(3) The method of Gudden has been pursued by but one experimenter,¹ and but one of his experiments was successful. This, however, affords important information and is therefore stated in full.² Von Monakow of St. Pirminsburg divided one half of the spinal cord just below the medulla in a new-born rabbit. Six months afterward the animal was killed. The following parts above the place of division were found atrophied: the posterior median column with the nucleus gracilis except in its median half which had not been involved in the division; the posterior lateral column with the nucleus cuneatus; the direct cerebellar column and its tract in the corpus restiforme; the formatio reticularis in its external two thirds lying internal to the ascending root of the fifth nerve, from the medulla as far up as to the anterior corpus quadrigemnum; the lateral part of the lemniscus; the fibres connecting the nuclei gracilis et cuneatus with the olivary body (bogenfasern); the centre of Deiters or outer acoustic centre, on the side of division. On the side opposite the division the olivary body and the lemniscus were partly atrophied. The atrophy could not be followed up to the optic thalamus or internal capsule, hence v. Monakow concludes that no direct sensory tracts exist from the cord to the brain, but that all impulses are sent to gray centres in the medulla and pons, and thence are transmitted indirectly by new fibres upward. The paths of sensory impulses as determined by his experiment would be the formatio reticularis and interolivary tract in the medulla and the lemniscus and formatio reticularis in the pons and crura, and the corpus restiforme to the cerebellum. But as the atrophy in the corpus restiforme involved only the direct cerebellar columns all the way to the cerebellum, and affected its inner

¹ That is for the purpose of determining the course of the sensory tracts.

² Monakow: "Exper. Beitrag zur Kenntniss des corp. Restiform." *Arch. of Psych.*, xiv., 3, Nov., 1883.

third only as far as the Deiters centre which lies in the medulla, he considers the transmission to the cerebellum of sensory impulses, except by the direct cerebellar columns, a matter of much doubt. These results of his investigation agree with the statement of Flechsig in the most important particulars and oppose distinctly the statement of Wernicke as to a double decussation through sensory tracts passing to the cerebellum.

Closely allied to this method of Gudden and in some respects in correspondence with it is a method of investigating the course of sensory tracts in infants born with defective brains. If (as Flechsig teaches) the tracts between brain and spinal cord develop in the direction in which they convey impulses, it would be possible to distinguish between centripetal and centrifugal fibres definitely in the nervous system of an infant born with a nervous system deficient either as to brain or as to cord.

The subject of microcephalic brains is one to which hitherto little attention has been given, probably because of their rarity, and also because their importance for anatomical purposes has not been appreciated. I have been able to find but one well recorded case of a microcephalic brain.¹ I have been fortunate enough to secure such a brain, through the kindness of Dr. Northrop, Pathologist of the New York Foundling Asylum, and its examination has been the original motive for this essay.

The following is the description of this brain.² The spinal cord below the second cerv. vert. was unfortunately not removed.

¹ This is the case described by Rohon, and published in pamphlet form by him. My thanks are due to Dr. Spitzka for calling my attention to, and for lending me, this pamphlet which was sent to him by the author.

² It may be as well to state that this infant presented by the breech, was born alive, and lived one week. It took nourishment and cried like a normal infant, but made no voluntary movements and seemed incapable of perceiving sensations. It slept much of the time, waking only to nurse. It did not attract attention by any peculiar symptoms, and no further history of it was taken.

Microcephalic Infant who Lived Seven Days.

Autopsy.—Head : On opening the head by means of incisions along the sutures a large amount of serum was evacuated. The two parietal bones were removed together. It was then found that there was a marked deficiency in the development of the brain, there being no evidence of cerebral tissue in the anterior and middle cranial fossæ or above the tentorium cerebelli. The *dura mater* lined the cranial cavity but presented at several points an abnormal appearance. Anteriorly, in the median line where two layers should be reflected from the sides of the groove to form the falx cerebri but one layer was present springing from the left margin of the groove. The right layer was deficient for a space of two inches anteriorly, so that at this place the falx cerebri was deficient upon the right side, and a probe could be thrust forward into a cul-de-sac (the foramen cæcum) at its anterior extremity. The falx was normal in its formation and attachments posterior to the coronal suture but its margin hung free in the cranial cavity, there being no brain tissue on either side. The longitudinal sinus in the falx was closed anteriorly opposite the coronal suture so that it did not open into the cranial cavity through the deficiency above described. About three quarters of an inch to the left of the falx, and extending parallel with it, arising from the inner surface of the frontal bone, and from the left parietal bone, was an abnormal reduplication of the *dura mater* similar in appearance to the falx but less extensive. This layer of *dura* was attached posteriorly to the margin of the left petrous bone, anteriorly to the left posterior clinoid process of the sphenoid bone. It was therefore stretched across the left anterior and middle fossæ and divided the space into two parts, the outer of which was twice the size of the inner. Contained within the layers of this process of the *dura* and situated near its free margin about half way from the inner surface of the frontal bone to the apex of the petrous bone was a small mass of tissue oval in shape, one inch in antero-posterior and vertical diameters and half an inch in thickness, which had the gross and microscopic appearance of cerebral substance. It had no connection with the cerebral tissue at the base and must have developed independently. It was the only evidence of an attempt at the formation of cerebral lobes. As it could have developed from the prosencephalon only, and as no other tissue was present which had developed from that portion of the cerebral vesicle, it seemed probable that its presence indicated that the prosen-

cephalon was torn away from the thalamencephalon at a very early stage of foetal life and had therefore failed to develop excepting to this rudimentary degree. On the right side a fold of dura mater extended across the middle cranial fossa. It arose from the posterior margin of the lesser wing of the sphenoid from the clinoid processes, and from the margin of the petrous portion of the temporal bone. It did not reach as a whole the inner surface of the squamous portion of the temporal bone but was held out toward, and partly attached to that bone by six fibrous bands which radiated from its free margin. There was no similar fold on the left side. Other parts of the dura, viz. : the parietal layers and the sinuses, were normal.

The mass of cerebral tissue present was surrounded by a thick *pia mater* containing many *blood-vessels*. A plexus of these vessels lay upon its upper surface. Upon its lower surface the distribution of the vessels was abnormal. The vertebral arteries joined to form a basilar artery, which lay upon the pons, but was not straight, but was thrown into numerous curves. This basilar artery divided into two arteries, each of which passed outward and forward, giving off numerous vessels to the cerebellum, and to the plexus already mentioned, and joined at their anterior terminations the internal carotid arteries. There were no anterior cerebral or anterior communicating arteries, and hence the circle of Willis was not complete.

The cerebral mass which was present is represented in its exact size in figures 1 and 2. The *upper surface* presented the appearance of a normal, but small, cerebellum and medulla, while anterior to the vermis cerebelli a mass of gray matter was seen not presenting an appearance similar to the corpora quadrigemina or optic thalamus, but consisting of a mass of irregular gray substance, continuous with a second mass, the latter having an appearance of two symmetrical oval bodies with smooth surface separated by a shallow fissure. This gray mass was very soft, and in the process of extraction it was injured upon the right side, and was detached from the pons upon both sides.

The cord being cut through, the medulla and cerebellum were lifted carefully, and the entire cerebral mass was removed from behind forward. All the cranial nerves from the xii. to the iii. were divided in turn, none being deficient. From the thick mesh of pia mater and connective tissue lying beneath the irregular gray mass anterior to the pons, the optic tracts, chiasm, and nerves were easily distinguishable, but the optic nerves were smaller than

in a normal brain of like age. There was no appearance of lobulation, and no fissures were seen in the gray mass from which the optic tracts issued to form the chiasm. The tracts could not be traced outward, but sank directly into the mass as represented in fig. 2. The *lower surface* of the brain presented a number of abnormal features. The *medulla* below the level of the olivary bodies was small, and the anterior pyramids were wholly wanting. The olivary bodies were abnormally large and lay adjacent to one another, being separated by a deep fissure. No *fibræ arcuatæ* were visible. The *pons* presented a normal appearance externally. The longitudinal fibres characteristic of the *crura cerebri* were wanting, and the level of the mass of gray matter, whose surface was rough, which extended forward from the anterior margin of the pons was much below that of the normal level of the crura. From this mass of gray matter the iii. nerves issued directly, and were larger in size than in a normal brain.

The *cerebellum* was somewhat smaller than normal, but appeared to be perfectly developed in all respects; the normal lobes being well defined by the normal fissures. It measured 7.0 by 3 by 1.6 cm. The gray mass lying anterior to the pons presented two anterior prolongations, which ceased abruptly at a point 1 mm. from the mass.

The entire cerebral mass was put in Müller's fluid to harden, and at the end of six weeks was placed in alcohol.

It was evident from the parts of the cerebrum missing, that the prosencephalon had failed to develop, thus causing an absence of the entire cerebral hemispheres, the olfactory bulb and nerve, the corpus callosum, the corpora striata, the anterior commissure, and the fornix.

The thalamencephalon, or posterior half of the anterior primary vesicle, had developed to some extent, as was evident from the two masses of gray matter from which the optic tracts and nerves arose, but its development was not normal. For the purpose of accurate comparison the normal brain of a child one week old was obtained and hardened, and horizontal sections were then made with a Thoma microtome through the medulla, pons, and crura, both of the normal and of the microcephalic brain. The sections made were from 20 to 30 μ thick, those in the crura being necessarily thicker than those in the medulla and lower pons, on account of the brittle nature of the tissue. Every set of ten successive sections was given a number, and one or two of each set of these sections were stained and mounted. Weigert's method of

staining with acid fuchsin¹ was used, and also the method with ammoniac-carmine. From the mounted sections those were selected for drawing which demonstrated the course of the various tracts and the presence or absence of the various nuclei and objects of interest. It was considered needless to draw all the sections made. Those which are given are drawings of sections at intervals of about 1 cm. from the first cervical nerve upward.²

In the spinal cord at the level of the first cervical nerve (fig. 3) it will be noticed that the postero-lateral columns are absent and that in consequence the shape of the cord is abnormal. The anterior gray horns are small, but their cells present a normal appearance. The anterior fissure is deep at the normal position of the pyramidal decussation. The posterior columns, the posterior gray matter, and the caput cornu on both sides are normal.

In the medulla, at the level of the beginning of the nuclei gracilis and cuneatus, the first decussating fibres appear; at the same level, the ascending root of the fifth nerve become distinct. The contrast between the large number of decussating fibres in the normal, and the small number in the abnormal specimens, was marked. The angle at which these fibres decussate was greater (*i. e.*, more obtuse) than that at which the fibres of the pyramidal tracts in the normal specimen met, thus indicating that they are independent of any pyramidal fibres. In the next figure, fig. 4, the origin of these decussating fibres is seen to be from the nuclei gracilis and cuneatus. *The existence of this decussation, in a specimen in which pyramidal tracts are wholly absent, proves the independent existence of the sensory decussation.* It is noticeable that the number of decussating fibres is small, the decussation occupying a small area in all the specimens through this series, and lying deep within the medulla at the bottom of the anterior fissure, and just anterior to the central canal. At the centre of the decussation, where its fibres are most numerous, the area occupied is but one third of that occupied by the decussation at this point in the normal specimen. It is, therefore, evident that in a normal medulla the decussation of motor and sensory fibres takes place, at least in part, at about the same area, and that the pyramidal and sensory decussations do not lie entirely separate, the one below the other. The absence of pyramidal tracts and decussation influences the shape of the medulla to a marked degree,

¹ See Weigert's article, *Centralbl. f. med. Wissensch.*, 1882, Nos. 40 and 42.

² Eighteen drawings with the sections accompanied the essay. Only those which are necessary are given here.

and also the arrangement of the gray matter; the anterior horns not being cut off from the central gray matter in the abnormal specimen until the sensory decussation is fully developed. There is little difference between the normal and abnormal specimen as far as the development of the nuclei gracilis and cuneatus, the nuclei cuniati accessores, the formatio reticularis, and the fifth nerve are concerned. In the sections just above fig. 4, the numerous fibres passing to the olivary body of the *same* side from both nuclei, were clearly seen. In fig. 5, the abnormally large size of the olivary body in the abnormal specimen is already evident, and a large number of fibres are seen issuing from the large olivary body and passing toward the raphé. Many of these can be followed across the raphé into the formatio reticularis of the opposite side, where they are lost as they turn toward the restiform body. The inner olivary nucleus is smaller in the abnormal specimen, and is seen to be circular; its cells are of the same size and character as those of the olivary body. The outer olivary nucleus is absent in the abnormal specimens.

The interolivary tract appears to be much more narrow, and has a shorter antero-posterior (ventro-dorsad) diameter than in the normal specimen; this is evident at all levels, but especially in section fig. 5. The small size of the interolivary tract in this brain supports the assertion of Flechsig. According to Flechsig, the normal interolivary tract consists of two parts. The smaller of these is the continuation upward of sensory fibres which have decussated in the sensory decussation. It increases in size from below upward, in the reverse ratio to that in which the nuclei gracilis and cuneatus decrease in size,—that is, as these nuclei send fibres upward to the opposite interolivary tract, they grow smaller and it grows larger. The larger of the two parts of the interolivary tract is a continuation of that part of the lemniscus which comes from the lenticular nucleus through its pillar (the Linsenkernschlinge). In this microcephalic brain there was no lenticular nucleus; the lemniscus was small, and this second or larger part of the interolivary tract was absent. There were present nuclei gracilis and cuneatus, and the smaller part of the interolivary tract was present. *It is, therefore, evident that a portion of the interolivary tract develops from below upward, and is in relation with the nuclei gracilis and cuneati.* And, further, that a portion of the interolivary tract develops from above downward, and being in relation with the nucleus lenticularis is absent when it is absent.

The raphé in the abnormal specimen is deficient in the number of its antero-posterior (ventro-dorsad) fibres. This is to be brought into connection with the deficiency of the pyramidal tracts, by means of which the central cortex is joined with the cranial nerve nuclei. It has been supposed that fibres leave the pyramidal tracts at various levels in the pons and medulla, and, turning backward, pass along the raphé to the cranial nerve nuclei. The absence of these fibres taken in connection with the absence of the pyramids proves this hypothesis to be well founded.

There is a marked difference between the abnormal specimen and a normal one in the number of decussating fibres in the anterior (ventrad) part of the raphé. This is doubtless due to the same cause as the deficiency of fibres between the pyramids and the cranial nerve nuclei, and may be considered as evidence that the fibres from the pyramids to the nuclei not only pass in the raphé, but also decussate in the raphé soon after entering it, and at a point nearer to the anterior (ventrad) than to the posterior (dorsad) surface of the pons and medulla.

It is to be noted that the shape, size, and appearance of the gray matter on the floor of the fourth ventricle, of the cranial nerve nuclei, and of the roots of the cranial nerves, of the ascending root of the fifth nerve, of the solitary bundle, and of the formatio reticularis, do not differ at all from those of a normal brain. Although to external appearance the medulla was apparently deficient in arciform fibres, the sections show that these are present in about normal numbers.

The deformity in the general shape of sections through the medulla is due to the absence of the pyramid, to the large size of the olivary bodies, and to the existence of a deep fissure between them.

In the pons (figs. 6 and 7) the most noticeable feature of the specimens is the total absence of the *longitudinal fibres* in the ventral half. This half of the pons is made up of transverse fibres coming from the cerebellar hemispheres and of gray nuclei which are scattered irregularly between the transverse fibres, and which cannot be separated into superficial and deep layers as in the normal specimen. The absence of the longitudinal fibres diminishes the size of the pons, and also its shape, the ventral half being narrower in ratio to the dorsal half than in the normal specimen.

The same comparative deficiency of fibres in the *raphé*, both ventro-dorsad and decussating, which was found in the medulla is evident in the pons, and confirms the supposition that these fibres

have a relation to the longitudinal fibres of the pons, and join these with the cranial nerve nuclei.

In a normal pons the *lemniscus* is a noticeable feature, being made up of the fibres from the interolivary tract, which change their relative position as they ascend, turning ventrad and laterad ; so that from occupying a rectangular area adjacent to the raphé with its long diameter parallel to the raphé in the lower part of the pons, it comes to occupy an oval area adjacent to the pyramidal tracts with its long diameter at right angles to the raphé in the upper part of the pons. The position of the lemniscus in the abnormal specimen is normal, but its size is small, and the area occupied by its fibres is about one half that in the normal specimen. This corresponds to the deficiency of fibres in the interolivary tract which has been noticed. The fibres of the lemniscus which are deficient are those which lie most internally in the normal lemniscus, the portion which, according to Wernicke, can be traced to the linsenkernschlinge, a formation which is absent in this specimen. As the lemniscus is traced upward through the pons its fibres become more and more deflected away from the median line, so that at the upper level of the pons (fig. 7) they are seen to approach the lateral boundary of the dorsal half and to be curving upward (dorsad).

It is evident, therefore, that a continuous tract can be traced from the nuclei gracilis and cuneatus across the median line, through the interolivary tract into the lemniscus, and upward into the tegmentum of the crus cerebri, where it lies in the external lateral part of that body.

The *formatio reticularis* presents a normal appearance in the abnormal specimen throughout the pons.

The *posterior longitudinal bundle*, whose fibres in the medulla could not be accurately distinguished from those of the interolivary tract, is well seen in all the sections through the pons, and presents a normal appearance both as to size and as to situation.

The nuclei upon the floor of the fourth ventricle occur in their regular order and position and present nothing worthy of remark. The ascending root of the trigeminus increasing in size as it ascends through the lower half of the pons, meets the descending root at the junction of the upper and middle thirds, and being joined by the motor fibres from the motor nucleus the nerve issues from the lateral part of the pons.

The *ependyma* upon the floor of the fourth ventricle appears to be of abnormal thickness, and the cells of cylindrical epithelium

are large. The ependyma is thrown into folds along the floor, so as to give a crenated appearance to all the upper margins of the sections. It is also to be noticed that a distinctly marked post-fissure exists throughout the pons, which is abnormal. Numerous vacuoles are seen throughout the pons, and the blood-vessels are very numerous. When the crura cerebri are reached (fig. 8), the abnormal specimen is seen to differ widely from a normal one, owing to the facts that the roof of the aqueduct of Sylvius is wanting, and that *there are no corpora quadrigemina*. The gray matter lying beneath the floor of the fourth ventricle becomes very thick, and there appear groups of gray nuclei in the external dorsad portion of the specimens, to which nothing analogous is found in the normal specimen. The nuclei of the fourth and third nerves appear to be crowded inward toward the median line and to be displaced downward (ventrad), so that many of the cells lie ventrad of the posterior longitudinal bundle. The number of cells from which third nerve fibres arise, and the number of the third nerve fibres seem to be greater than normal. The third nerve issues from between the red nuclei. The fourth nerve fibres pass outward along the upper border of the red nuclei. The red nucleus is visible, and the decussation of the superior peduncle of the cerebellum, whose fibres are destined to end in this nucleus, is evident in the specimens just below this level. Before the brain was cut it was noticed that the superior peduncles of the cerebellum met and disappeared beneath the lemniscus at a more obtuse angle than normal, and this is evident from the sections, in which the superior peduncles in their full extent were seen to appear suddenly and to decussate at a very obtuse angle.

Many of the sections through the crura cerebri were imperfect. This portion of the brain in the specimen consisted almost entirely of gray matter, and was very difficult to handle, and badly hardened.

As already stated, the peduncles of the crura were absent, the tegmentum alone being present. This left the substantia nigra and red nucleus lying free upon the ventrad surface, with a deep fissure between the two halves of the tegmentum. Some of the gray substance thus lying free crumbled away when the specimen was handled, although great care was taken to prevent such crumbling. It is possible that the portion thus destroyed may have formed a substantia nigra, but in the section as drawn, no such collection of cells (which at this age would not be pig-

mented) was found. The *red nucleus*, however, is intact in several sections and presents about the normal size, shape, and appearance. It is limited ventrad, fig. 8, by a few fibres which pass around it, and which may be likened to the arciform fibres of the medulla, but from their direction cannot be considered as belonging to the superior peduncle of the cerebellum. In fig. 8, the fibres of the third nerve are seen to pass through the red nucleus. The extent and contour of the red nucleus, are well seen in fig. 8, which is made about at its centre. At a higher level a collection of cells of oval shape was seen lying between the red nucleus and the posterior longitudinal bundle. Its shape and appearance resembled that of the corpus Luysii, but its position was not that of that body, which is not found in the specimen. The absence of corpora quadrigemina is evident, but the thick layer of gray substance forming the dorsal border of the crus with its collection of gray cells does not resemble in respect of shape or microscopic appearance, in any degree, these deficient bodies.

It was impossible to obtain sections through the portions of the cerebral mass lying above this level, on account of the imperfect hardening of the specimen. Inspection of the cut surface with a lens showed no appearance of white fibres. There was simply a mass of gray substance which crumbled on the knife, surrounded by a layer of thick connective tissue. Optic tracts could not be found.

To sum up the results derived from the examination of this specimen it may be stated that the chief characteristics are (1) the total absence of pyramidal tracts in all parts of the nervous system, and the deficiency of a portion (about half) of the lemniscus, in the crura, pons, and medulla; (2) the presence of a portion of the lemniscus, and of the interolivary tract; (3) the presence of the *formatio reticularis* in its entire extent; (4) the presence of the gray nuclei on the floor of the fourth ventricle, with their nerve-roots and nerves; (5) the presence of the peduncles of the cerebellum, and of a normal cerebellum.

These facts are to be brought into relation with the absence in the cord of those tracts which are known to be motor, and the presence of those tracts which are known

to be sensory. It seems evident, therefore, that in this microcephalic brain all the motor tracts in the crura, pons, and medulla are wanting, and that all the sensory tracts are present. The specimen is, therefore, of great value in tracing the sensory tracts.

The sensory tracts in the cord were normal and led to the portions of the medulla which have been stated as sensory. These are the nuclei gracilis and cuneatus, formatio reticularis, and direct cerebellar tract. From the nuclei gracilis and cuneatus some fibres passed through the sensory decussation into the interolivary tract, whence they went upward, formed the outer portion of the lemniscus, and turning upward, passed external to the red nucleus toward the internal capsule. From the nuclei gracilis and cuneatus other fibres passed to the formatio reticularis, there joining fibres which came from the gray matter of the cord; and these together passed up through the medulla, pons, and crura without decussating. The direct cerebellar tract went to the vermiform lobe of the cerebellum—to end in its cortex.

The result of the examination of this specimen supports the conclusion of Flechsig, that tracts develop in the direction in which they convey impulses. Flechsig reports a case¹ which, in some respects, resembles this one. In his case a division had occurred between the brain above and the pons below the corpora quadrigemina; the pyramidal tracts in the pons are wholly wanting, and the lemniscus was diminished to one third of its natural size,² while no changes were found in the dorsal half of the pons. In the medulla, the olivary lobes were small, the interolivary tract was reduced to one half its normal extent, the place of the absent pyramids was taken up partly by arciform fibres and partly by "gelatinous substance." The upper decussation was normal. The lower decussation was absent and the fibres of the posterolateral columns (*i. e.* pyramidenbahn) of the cord were absent.

¹ "Leitungsbahn im Gehirn u. Rückenm.," p. 120.

² In the text the statement is that the lemniscus was reduced to two thirds of its normal size, but in the "Plan d. Mensch. Gehirns," p. 26, this is corrected so as to read one third, as stated above.

The sensory columns of the cord were normal in all respects. (See Taf. xvii., 1-12.)

In Rohon's case¹ there had developed a cephalic mass above the pons about as large as the cerebellum; and from this a very few fibres issued, forming a thin crusta on each side, but ending in the substantia nigra. In the pons and medulla the same deficiency of longitudinal fibres and pyramidal tracts was found, as in Flechsig's case. But Rohon found a lower pyramidal decussation present. (The plate which he gives as a proof of this pyramidal decussation is a plate of the lower part of the sensory rather than of the motor decussation, as is seen by the fact that the nuclei gracilis and cuneatus can be seen in it, and the number of fibres decussating is much less than in a normal brain at this level.) He, therefore, concludes that in the process of development the pyramidal fibres develop from the brain downward to the point of decussation, and from the cord upward to the point of decussation, and these two parts developing independently unite to form a continuous tract. This conclusion is in direct opposition to the conclusion reached by Flechsig, that the pyramidal tracts develop from above downward along their entire extent.

Up to this time no case has been offered to decide the controversy. But the case here described is such a case, and it proves that the assertion of Flechsig was well founded. In this case the pyramids are wanting in pons and medulla, the pyramidal decussation is wanting, and the continuation of the pyramidal tracts in the spinal cord in its postero-lateral columns is absent. If the pyramidal tracts develop from above downward the case is easily explained. The hemispheres were absent, and the pyramidal tracts failed to develop. If the pyramidal tracts develop partly from below upward, why were they absent in this case, when all other parts of the cord which are known to develop from below upward were present?

While it is impossible to dispute Rohon's assertion that the pyramidal decussation was present in his case, the diagrams which he offers fail to prove it; and the case of Flechsig, taken in connection with the case here described, prove that Rohon's generalization is erroneous. *The pyramidal tracts develop from above downward in the direction in which they transmit impulses.*

In Rohon's case the lemniscus and interolivary tract are not of normal size, but are more fully developed than in Flechsig's

¹ Rohon: "Untersuchungen über den Bau eines microcephalen Hirnes." Wien, 1879.

case, or in my case. Rohon was able to trace lemniscus fibres to both corpora quadrigemina, which was impossible in the other cases. The other parts were normal in all three cases.

It may therefore be stated that in the brains of three microcephalic infants all the voluntary motor tracts had failed to develop. This failure had not extended to the gray matter of the floor of the fourth ventricle, to the posterior longitudinal bundle, to the formatio reticularis, to the outer half of the lemniscus, to the olivary bodies and interolivary tract, or to the cerebellar peduncles. In some or all of these parts therefore the sensory tracts must lie. It can be shown from pathological facts, that the sensory tracts do not lie in the gray matter of the fourth ventricle, nor in the posterior longitudinal bundle. The olivary bodies are in functional relation with the cerebellum, for they are anatomically joined to it by the inferior peduncles; atrophy of one cerebellar hemisphere is always associated with atrophy of the opposite olivary body; destruction of an olivary body produces cerebellar incoördination. It can be shown that the sensory tracts do not lie in the olivary bodies or cerebellar peduncles. Hence by exclusion it is evident that the sensory tracts must lie in the formatio reticularis, in the lemniscus, and interolivary tract.

It may be added here in order to complete the record of this case, that sections through the superior vermiciform lobe of the cerebellum and through the cerebellar cortex showed their structure and nuclei to be normal.

(4) The method of tracing tracts by means of observing secondary degenerations in the medulla and pons has been of more use in determining the motor paths than the sensory. After lesions in the motor area of the brain, either in the cortex or in the internal capsule, the longitudinal fibres lying in the middle two quarters of the crus cerebri and in the anterior (ventral) half of the pons and medulla degenerate

downward.¹ After lesions in the crus or pons involving the parts lying posterior to these tracts a secondary degeneration downward is observed in the inner two thirds of the lemniscus, which can be followed through the interolivary tract and into the olivary body of the same side²; and a secondary degeneration upward is observed in the outer third of the lemniscus, which can be followed upward nearly to the optic thalamus, and into the internal capsule of the same side. This latter is the only tract in the pons in which an ascending degeneration has been traced, and its discovery confirms the assertions already stated of various anatomists, that in the lemniscus at least a portion of the sensory impulses pass upward to the brain.

(5) In the absence of further information to be derived from the methods of investigation already considered, it is necessary to consider the more carefully the facts afforded by a study of pathological cases. Lesions of limited extent in the medulla, pons, and crus are not infrequent, but cases available for the present purpose are very rare. This is due to several causes. A lesion of any considerable extent in these parts, especially if situated in the posterior (dorsal) half of the medulla or pons, usually causes sudden death by injuring the centres of the pneumogastric nerves. A lesion in the anterior half of the medulla or pons involves the motor fibres only, and gives no information regarding the exact course of the sensory tracts. The arterial supply of the anterior part of the medulla and pons is derived from the basilar artery, and disease of this vessel may give rise to symptoms chiefly referable to the tracts in the anterior half of the pons. It is from disease of this vessel that lesions of the pons are usually due, softening from

¹ Türk: "Wien. akad. Sitz. Bericht." *Math-nat. Cl.*, 1851, Bd. vi., S., 288. Charcot: "Localization des maladies cerebrales." Paris, 1881.

Brissaud: "Recherches sur la contracture permanente des Hemiplegiques." Paris, 1880.

² And in one case as far downward as through the sensory decussation to the nucleus gracilis. Spitzka: *Amer. Jour. of Neurology*, Feb., 1884.

embolism or thrombosis, and hemorrhage being the forms of lesion most frequent in the pons. For these reasons cases of disturbance of the sensory tracts from lesions in these parts are rare. From a lack of accurate knowledge of the microscopic anatomy of the parts many descriptions of lesions are so indefinite as to be of little use in determining the connection of symptoms with lesions. And lastly, the record of the symptoms in many cases is imperfect. Under these circumstances it is not surprising to find that Nothnagel, whose study of local brain lesions is the most complete and careful of any hitherto published,¹ concludes that the cases recorded up to the time of his writing (1879) were not sufficient in number, nor in such accord, as to warrant any statement more definite than the following: "The lesions of the pons producing anæsthesia are usually situated in the lateral portions in the vicinity of the floor of the fourth ventricle, and all kinds of sensations are equally affected." Since the publication of his work, however, a number of cases have been published in various countries and in different journals which, when collected and compared, afford valuable information on this subject. It is to the study of these cases that we now proceed.

It is well known that lesions limited to the anterior (ventrad) half of the pons, and affecting only the transverse and longitudinal bundles, do not produce sensory symptoms. Many cases are recorded which establish this fact. They need not be cited here.² It is admitted that disease which does not extend to or involve the parts lying dorsad of the deep transverse fibres of the pons does not give rise to disturbance of sensation. It follows that the sensory tracts

¹ Nothnagel: "Topische Diagnostik der Gehirnerkrankheiten," Berlin, 1879.

² The following cases are referred to, however, as they illustrate this position: S. M. Burnett, Knapp's *Arch. of Ophthalm.*, vi., 469; Janeway, *N. Y. Med. Jour.*, xxxi., 66; Crandall, *Phil. Times*, ix., 313; Pousson, *Progrès Médical*, x., 560; Ballet, *Progrès Médical*, viii., 657; Gautier, *Gaz. Hebdom.*, 1881, p. 701; *Brain*, vii. and viii.; Wernicke, iii., 415; Judell, *Berlin. klin. Wochen.*, 1872, No. 24.

do not lie in the pyramidal tracts, or in the transverse fibres, or in the gray nuclei of the pons lying between these parts—*i. e.*, in the parts ventrad of the lemniscus.

Lesions situated in and limited to the gray matter of the floor of the fourth ventricle, not destroying or compressing subjacent parts, have been recently studied by Weichselbaum,¹ De Jonge,² and Luys.³ Twenty-three cases of such lesions have been collected by these authors. The symptoms in all these cases were referable to destruction of the cranial nerve nuclei. In none of them were there disturbances of sensation in the body. It follows that the sensory tracts do not lie in the gray matter of the floor of the fourth ventricle, a conclusion which is confirmed by the study of cases of bulbar paralysis, in which sensory symptoms do not occur unless the lesion extends to the *formatio reticularis*.

By exclusion therefore the conclusion is reached that the sensory tracts in the pons must lie between the deep transverse fibres and the gray matter of the fourth ventricle; that is, in the *lemniscus* or *formatio reticularis*.

In the following cases these tracts were involved in the pons or in the medulla, and disturbances of sensation were produced. In some of them both the parts mentioned were affected, and then all kinds of sensation were disturbed. In others but one of these parts was affected, and then some kinds of sensation escaped. The study of these cases therefore will establish not only the course of the sensory tracts already indicated by the anatomical and embryological investigations already described, but may indicate the course of different sensory tracts. The cases are first cited and then analyzed.

CASE 1.—Softening in the pons and medulla—sensory symptoms.

¹ Weichselbaum: *Wien. med. Wochenschr.*, 1881, No. 32.

² De Jonge: *Arch. f. Psych.*, xiii., p. 666.

³ Luys: *L'Encephale*, 1883, No. 3.

Male, aged fifty, after having suffered for some time from vertigo, was suddenly seized with a feeling of fulness in the head, and a peculiar paræsthesia of the right half of the body, not including the face. This paræsthesia became less after a few days, but there remained a diminution of sensation and a marked ataxia in the right limbs. Eight months after the attack the patient was examined by Dr. Kahler, who found that in both right extremities there was a very marked ataxia upon any motion, which was not increased when the patient's eyes were closed, a loss of the power of perceiving the location of these limbs, and a loss of the sensation of pressure. He had a constant feeling in the right half of the body as if the muscles were contracted. There was no loss of muscular power, and no diminution of tactile sensibility. Other symptoms were nystagmus, paralysis of the left abducens, paralysis of the muscles which open the glottis on the right side. The patient was under observation for two years, during which time there was no change in the symptoms. Cause of death not stated.

Autopsy.—A brown discoloration was found upon the floor of the fourth ventricle in the caudad part of the pons, which was found to correspond to a focus of softening. This focus began in the middle of the left olivary body, and extended upward for 8 mm. through the dorsal segment of the pons in its centre, on both sides of the raphé, but more especially on the left side. The left olivary body and the left interolivary tract were the parts chiefly affected by the lesion. The pyramidal tracts in the pons and medulla, and the lateral parts of the pons and medulla presented a normal appearance.—O. Kahler: *Prager medisch. Wochens.*, 1879, Nos. 2, 3, and 4.

In the discussion of this case Kahler cites two cases of Leyden's. One of these cases he quotes as follows:

"In a case of Leyden's, in which very marked ataxia of all four extremities was present, the autopsy showed the presence of three small foci of embolic softening lying in the middle of the substance of the pons, but not affecting the pyramidal tracts."¹

The other case is as follows:

CASE 2.—Softening of interolivary tracts in the medulla—general ataxia.

Male, aged sixty-two, was suddenly seized with vertigo and headache, but was able to walk home. From the onset of the

¹ This case of Leyden's is recorded in his "Klinik d. Rückenmark—krankheiten," I.

attack he was unable to swallow, and three days afterward was brought to the hospital. He complained of headache and vertigo, of inability to swallow, and of inability to stand or walk, or to use his arms and hands on account of loss of power of co-ordination. Examination showed pupils equal; no paralysis or anæsthesia of the face; speech indistinct, especially in pronouncing *T*; tongue protruded straight, but slowly, and tremor was marked; total inability to swallow; constant hiccough; marked ataxia of both hands and both legs, so that he cannot feed himself, or stand, and walking is impossible, even with assistance. Sensibility seemed perfectly normal in all parts of the body, as was also the sense of pain. In the course of a few days an intense redness of the face was noticed. The symptoms remained stationary. He grew weaker, and became delirious, respiration became irregular, and in six days after the attack he died.

Autopsy.—All parts of the nervous system were normal excepting the medulla oblongata. In the medulla an area of softening was found extending vertically from the middle of the olivary bodies cephalad $\frac{1}{2}$ cm. to their upper limit, and occupying the entire interolivary tract on both sides from the gray matter of the floor of the fourth ventricle to the pyramidal tracts, which latter tracts were slightly involved in the degeneration. The entire raphé was destroyed. The lesion did not reach the pons. The nerve fibres were swollen or atrophied or in a state of degeneration. The process was an acute myelomalacia.—Leyden: *Arch. f. Psych.* vii., pp. 57-61.

CASE 3.—Softening of one lateral portion of the medulla—sensory symptoms.

Male, æt. fifty-six, on waking in the morning found that he was ill, was dizzy, and could not walk, having a tendency to fall to the left, but no paralysis. His left face felt cold, he could not talk plainly, and had difficulty in swallowing. When examined five days after it was found that he could walk only when assisted, and tended to fall to the left, though when seated all motions were good, without ataxia—the right arm trembling, however, slightly. No facial or hypoglossal paralysis, and ocular muscles normal; swallowing difficult. Sensation was lost in the left side of the face and in the right half of the body and right limbs. The right limbs soon became livid. The patient always knew the position of his limbs. He died fourteen days after the attack, the pulse having been rapid, 130, from the first.

Autopsy.—An area of softening, due to thrombosis of the left vertebral artery, was found in the lateral dorsad caudad portion of the left half of the medulla. The left corpus restiforme, and adjacent part of the floor of the fourth ventricle and formatio reticularis were yellow and softened for 1 cm. in length. The area extended from the viii. to that of the xii. nerve, and involved the restiform body, the adjacent nucleus cuneatus, the formatio reticularis, the ascending v. root, the motor nucleus of the vagus and its fibres. The olivary body, the sensory nucleus of the vagus, and the hypoglossal were not involved.—H. Senator: *Arch f. Psych.* xi., p. 713.

CASE 4.—Softening of one lateral portion of the pons—sensory symptoms.

Male, æt. 50, after suffering for several months from headache and vertigo, was suddenly seized with a sensation as if the entire right side of the body was swollen. When this passed off there was found to be a diminution of the tactile and muscular senses in the right side of the body (not including the face), diplopia, rotary nystagmus, and strabismus due to paralysis of the left sixth nerve, and marked ataxia in the right limbs. The senses of pain and temperature were not affected. Sense of location and of pressure much disturbed. A constant sensation of formication and distension was present in the entire right half except the face. The voice was loud and hoarse, and the patient could not whisper on account of paralysis of the right vocal cord. In the course of the following year a right-sided facial paralysis developed gradually, including the uvula. The disturbance of sensation increased, involving to some degree the senses of pain and temperature and the electro-cutaneous sensibility. The ataxia persisted till death, but true paralysis was not present. The speech became unintelligible as the facial paralysis increased, and the tongue became partly paralyzed. Before death the tongue could hardly be protruded and trembled constantly. He died three years after the onset of the symptoms.

Autopsy.—On the floor of the fourth ventricle beginning near the cephalad boundary and extending back to the striæ acusticæ was found an area of yellow-brown softening. On cutting the pons this was found to lie entirely in its dorsal third, and to the left of the raphé, and to extend from a point five mm. below the corp. quad. down to the upper limit of the olivary body in the medulla. The microscopic examination showed that the primary lesion was a softening due to thrombosis of the pons arteries, in the dorsad

division of the pons, near the raphé, and involved chiefly the formatio reticularis, the lemniscus, and the fibres of the left vi. The following parts were not involved : the pyramidal fibres, the entire transverse fibres of the pons, the middle peduncle of the cerebellum ; the entire nerve nuclei on the floor of the fourth ventricle, the right vi. fibres, and both vii. fibres. A secondary degeneration had developed downward, involving the interolivary tract and the left olivary body in its entire extent.—Kahler and Pick : *Vierteljahrsh. f. d. Prak. Heilk.*, 1879, Bd. 142, S. 96.

Case 5.—Hemorrhage in one lateral portion of the pons—sensory symptoms.

Male, fifty-eight, was suddenly seized with paresis of the left side of the body accompanied by total anæsthesia and loss of the skin reflexes, with total paralysis of the right facial, and abducens, and conjugate paralysis of the left internal rectus, with hyperæsthesia of the left half of the face. The tongue was paralyzed on the left side. Soon after the attack the temperature was lower on the left side of the body.

After one week the paresis had entirely passed away from the left side, but the anæsthesia remained, and was accompanied in the left hand by a loss of muscular sense which gave rise to marked ataxia. The left patellar tendon reflex was increased. The patient's chief complaint was of vertigo and tinnitus aurium. After five months the patient was examined again. There was then right facial paralysis with reaction of degeneration. There was conjugate deviation of the eyes to the left. There was no true paralysis of the extremities, but the ataxia made the left hand and arm useless, and it was slightly atrophied, but there was no contracture. There was partial anæsthesia of the entire left half of the body, greater in the arm than in the leg, and less in the face than in the body ; the sensations for temperature, pain, and pressure being entirely unperceived in the arm. The hyperæsthesia of the right face was no longer present, but the cornea and conjunctiva of the right eye were anæsthetic. Atrophy of the right half of the face, and difficulty of deglutition occurred during the last two months of life. All the symptoms persisted until death, which occurred nine months after the attack.

Autopsy.—Atheroma and miliary aneurisms were present in the larger brain arteries. A clot was found in the gray matter on the floor of the fourth ventricle, on the right side, in its upper half. The lesion involved chiefly the formatio reticularis, and the lemniscus. It had destroyed the right vi. and vii. nuclei and had

involved the post longitudinal bundle, thus probably producing the left internal rectus paralysis. It had reached and involved slightly the ascending root from the nucleus of the right v. and had also destroyed the descending root of the v. on the right side (which is thought by Meynert to go to the left v. nucleus). It had not reached the viii. centres. It did not affect the pyramids. Secondary degeneration was found to have taken place from the clot downward in the lemniscus, and this was traced to the inter-olivary zone and into the olivary body of the *same* side, this being much atrophied.—Meyer: *Archiv. für Psychiatrie*, xiii., p. 63.

CASE 6.—Hemorrhage in one lateral portion of the pons; sensory symptoms.

Male, æt. 41, had an attack of vertigo followed by difficulty of motion in the right arm and leg with formication in them and in the left half of the face, and diplopia. The disturbance of sensation remained for three months, while that of motion disappeared in a few hours. Nearly two years after the attack a second one, precisely similar, occurred, and he then entered Senator's division of the Augusta hospital. Examination showed analgesia in the left second branch of the trigeminus; neither eye could be turned to the left; paresis of the right arm and leg, which soon became almost total. Soon after paresis of the left facial and right hypoglossal developed and swallowing became difficult. The patient had a great diminution of the power of sensation of touch, pain, temperature, and the position of the paralyzed limbs, and the skin reflexes were here diminished, while the right patellar reflex was increased. These symptoms all increased in intensity, and it was also noticed that the right hand and forearm were warmer, damper from sweat, and more livid than the left hand and forearm. There were no urinary symptoms. His intelligence was undisturbed, and the special senses were normal. The anæsthesia and paralysis of the left half of the face and right limbs were nearly complete at the time of death, and the eyes were both directed to the right constantly—the pupils being normal. Seven weeks after his second attack he died.

Autopsy.—Atheroma and thrombosis of the left vertebral and posterior half of the basilar artery with softening of the pons and medulla were discovered. A hemorrhage was found on the floor of the fourth ventricle 1 mm. wide, 1 cm. long in the median line in the upper half. A second clot lay over the sixth nucleus. Section showed an extensive area of softening in the left half of the pons and medulla, involving chiefly its dorsad part near the gray matter

of the fourth ventricle, which appeared to be sunken in. This extended from the nucleus of the vi. to that of the xii. nerve, and to the lower end of the olivary body, being narrower at the ends than in the middle, and lying diagonally to the long axis of the pons, so that above, it was nearer the raphé and the dorsal surface than it was below. It therefore destroyed the formatio reticularis, all the nuclei in part from the vi. down to and including the hypoglossal, the lemniscus, and interolivary tract, the median part of the olivary body, the deepest fibres of the pyramidal tract, the ascending trigeminal root and the solitary bundle, and the median part of the restiform body. It touched the direct cerebellar column at the lowest limit. The right half of the pons and medulla were normal.

Remarks.—As the vi. nucleus was not involved it is necessary to suppose a centre for the conjugate movements of the eyes, lying outside of the vi. nucleus, which was destroyed by the lesion. The fibres to the right xii. were destroyed, while a portion of the left xii. nucleus remained, hence the deviation of the tongue to the right on voluntary motion.—H. Senator: *Arch. f. Psych.*, xiv., p. 2.

CASE 7.—Hemorrhage into one lateral part of pons; sensory symptoms.

Male, æt. fifty-eight, was suddenly seized with faintness and vertigo, and then noticed that his right arm and leg were numb as if asleep, but were not paralyzed. The numbness continued for some months, during which time his vision was blurred. It then passed off, but he continued to use his hand in a clumsy way. Two years after the first attack he had an aggravation of his symptoms—the numbness increasing, and his tongue becoming paralyzed for a few hours. He was then examined by Dr. Spitzka, who found that the man's movements with his right leg and arm were jerky and clumsy, and that he felt insecure in walking in the dark. There was ataxia of the right arm, knee-tendon reflex, exaggerated on right side. Skin reflexes absent on right side. No trophic disturbances. Tongue deviates to right. Speech thick after talking some time. Tremor of lips is present. Electric reactions normal. Tactile sensibility impaired in right hand, and on dorsum of forearm; also in right foot. Sensation of pain is quite acute. Sensation of temperature quite impaired. He cannot judge differences of weight five times as great as those recognized on the left side, and cannot judge of the nature of surfaces with his right hand. The direction in which a cold rod is laid

upon his skin is not accurately judged on his right side in arm and leg, and on the body to a less degree—to within three inches of the median line. Marked loss of muscular sense in arm and leg. Sensation slightly impaired on right cheek and lips. After a year the numbness extended to the left foot, and three months later the symptoms had increased in intensity to a marked degree, and he began to have difficulty in swallowing. Six months later the trouble in speech had increased, and he stumbled in speaking. At this time he had two attacks of dizziness and fainting, and, in addition to former symptoms, contraction of right pupil was noticed. Four months after this he became somnolent and apathetic, yawned a great deal, breathed irregularly, and œdema of the right hand, with a decided right hemiparesis and paraplegic weakness of the lower extremities was present. He did not appreciate when his bladder was full. At this time he took to his bed. Soon after he noticed tingling of *both* lower, and a subjective sense of stiffness in both upper, extremities, more marked on the right side. One month later left ptosis developed, and the tongue now protruded to the left. A few days after this involuntary discharges began, his intellect for the first time began to wander, and he suffered much from a feeling of coldness, though the room was so hot that he was in a profuse perspiration, and his temperature was normal. Six days before his death his breathing became stertorous, and right ptosis with extreme myosis was found, the previous left ptosis having passed off. He died comatose at age of sixty-two.

Autopsy.—Dura normal. Opacities in the great falx. Cerebrospinal fluid increased in quantity. Vessels calcified. In both hemispheres numerous capillary hemorrhages and small spots of softening were found, none more than 1 cm. in size. In the cerebellum several perivascular hemorrhages were found in the dentate nucleus and two miliary patches of softening, which were found to be recent, as were all the lesions except the one in the pons. In the pons an old hemorrhagic focus was found of irregular shape, lying wholly in the *left* half, and occupying the area of the lemniscus, being thus ventrad of the formatio reticularis, and dorsad of the longitudinal fibres of the pyramids.

The focus of disease consisted of a cavity with partly organized walls and intense contiguous tissue-changes. At the level of the motor nucleus of the v. the cavity was merely a slit, while the area of tissue-change around it occupied nearly the entire field of the lemniscus, failing to reach the raphé or the motor root of the

v. on either side. In lower sections the cavity became larger, and advanced ventrad involving the transverse fibres of the pons below the lemniscus. The contiguous tissue-change involved the raphé, and extended across the median line $2\frac{1}{2}$ mm. The cavity extended caudad as far as to the facial-nerve nucleus, which, however, was not involved.

An area of *descending degeneration* was found, involving the lemniscus and the interolivary tract on the left side down to the sensory decussation, where it was followed through the decussation into the opposite side of the medulla, where it involved the nucleus gracilis to a considerable extent, and the nucleus cuneatus in a lesser degree. The olivary body on the side of the lesion was not involved in this degeneration, although the field around it on all sides was involved. The internal accessory olivary nucleus was not involved. An ascending degeneration was traced, involving the middle third of the lemniscus as high as the level of the corp. quadrigeminum post. It could not be traced higher, but it was impossible to identify that division of the lemniscus which passes into the thalamic region of the left side.—E. C. Spitzka : *Amer. Jour. of Neurology and Psychiatrie*, Nov., 1883. Published Feb., 1884.

Spitzka cites the following case of descending degeneration in connection with his case :

CASE 8.—Among a number of cases of secondary degeneration in the pons medulla and cord studied by Homén (*Virchow's Archiv f. path. Anat.*, Bd. 88, S. 61–84), one is recorded in which a focus of softening in the left half of the pons was followed by degeneration downward, both of the pyramidal column and of the lemniscus. The latter was destroyed by the focus of disease at the level of the common nucleus of the abducens and facial nerves. Below this point the secondary degeneration of the lemniscus was traced as far as to the sensory decussation, lying in the lemniscus and interolivary tract. The case is accompanied by a very meagre history, which merely states that the patient was hemiplegic on the right side for three years. No reference is made to any sensory disturbance. It is, of course, impossible to draw any physiological conclusions from this case, but inasmuch as it supports the view of Flechsig that a portion at least of the lemniscus degenerates downward, it is cited here.

CASE 9.—Tubercle of the pons ; anæsthesia of the face alone. Male, æt. fifty-eight. Began to suffer in July from headache,

diplopia, and difficulty in opening the mouth. In August an examination showed the presence of left facial paralysis including all the branches of the nerve; spasm of the left masseter; no affection of the tongue; ptosis of both eyes, especially of the left; conjugate deviation of both eyes to the right, it being impossible to turn the right eye beyond the median line, or to move the left eye toward it. Pupils contracted. Sight impaired by old cataract. Smell, taste, and hearing normal; possibly a slight degree of deafness in the left ear. Loss of sensation to all stimuli and numbness of the right side of the face and neck. No paralysis, ataxia, or anæsthesia in the body or limbs. No urinary symptoms. These symptoms, with headache, vertigo, and vomiting, persisted till death occurred in October.

Autopsy.—On the floor of the fourth ventricle in the middle of its left half a tumor 2 cm. wide and $1\frac{1}{2}$ cm. long was found, which had involved the lateral-dorsal part of the pons, but did not reach the transverse fibres. The tumor was a tubercle, and was not surrounded by any zone of softening. It involved the left common abducens-facialis nucleus, the left facial nucleus and genu, the motor root of the trigeminus, and the descending root of the trigeminus on the left side, which decussates, according to Meynert. At a lower level it involved the eighth and ninth centres on the left side. The lemniscus and the greater part of the formatio reticularis were unaffected.—Wernicke: *Arch. für Psychiatrie*, vii., p. 513.

CASE 10.—Hemorrhage in one half of pons; sensory symptoms.

Female, æt. forty. In June, 1881, she had a sudden attack of vertigo and loss of consciousness, which had been preceded by a continuous occipital headache for several days. On recovering consciousness she found the right half of her body totally paralyzed, and noticed that the left ear was deaf. She did not notice any loss of sensation. A few days after the sight became dim in the left eye, the cornea became inflamed and cloudy, and, finally, she lost the sight entirely in that eye. Some weeks after the attack her right limbs became rigid and remained so three months. She never had any embarrassment of respiration. In October she was seen by Dr. Miles. At that time the right leg could be moved slightly, and the right arm fairly well, but its motions were ataxic, and power of grasp was much less than in the left hand. There was bilateral facial paralysis involving all the branches of both nerves, and producing immobility of the face and defective

pronunciation of the labials. The tongue was protruded to the right with an irregular, uncertain motion. There was no muscular atrophy, and faradic reaction was normal in all the muscles. For five months after the attack there had been a tonic contraction of the muscles of mastication, so that the teeth were not separable more than a quarter of an inch. There was no trouble in swallowing. The nails were found to be growing faster on the paralyzed side, but were not ridged. There was incontinence of urine and fæces. Tactile sensibility was normal, except over a small area of the lower right face, and entire left half of the forehead, and the middle third of the flexor surface of the right forearm, which areas were also analgesic. Tactile sense of the tongue was good. Taste and smell intact. Total deafness of the left ear; right ear normal. Speech was slow, jerky, and drawling, but there was no aphasia. There was no paralysis of the ocular muscles, and no ptosis. The left cornea was opaque from the presence of extensive pannus, and much hypertrophied.

In December, 1881, the spasm of the muscles of the left side of the jaw relaxed, and the right facial paralysis almost disappeared. By February, 1882, the left eye had atrophied and the cornea had sunk in. At times flashes of heat and redness, with tingling, occurred in the right half of the body and limbs, and the entire side was redder than the left. There was no polyuria. Patient was emotional, laughing and crying easily, but otherwise there was no loss of intellectual power. She grew weaker, bed-sores developed, and she died May 21, 1882.

Autopsy (twenty-eight hours p. m.).—Dura normal. Pia opaque and thickened, but not adherent. Arteries atheromatous. On the basilar artery at the inferior margin of the pons, a fusiform aneurism was found of the size of a bean. The left vii. was seen to be smaller than the right vii. The hemispheres were slightly atrophied. The lateral ventricles were distended with serum, and the ependyma thickened. The brain was wet but normal. On the floor of the fourth ventricle, in its left half, just above and external to the eminentia teres, a small yellow irregular depression was seen. Transverse section at this point showed an old hemorrhagic focus of stellate form, extending from five mm. below the caudad border of the pons, five mm. internally to the floor of the ventricle cephalad, nearly to the superior border of the pons, growing smaller as it ascended. The centre of the lesion lay anterior (ventrad) to the genu nervi facialis of the left side. From this point two arms extended forward, nearly reaching the

superficial transverse fibres of the pons. Nowhere did it approach the median line. In the right half of the pons at a point slightly anterior (ventrad) to the vii. nucleus was another focus, also old, of the size of a No. 5 bird-shot. Microscopic examination showed the presence of miliary aneurisms, also a descending degeneration of the crossed pyramidal tract in the right half of the cord, and of the direct tract in the left half. The left v., vii., and viii. n. nuclei were involved.—F. A. Miles : *Archives of Medicine*, Aug., 1882.

The lesion involved both the formatio reticularis and the lemniscus in the pons, as can be seen in the drawing accompanying the case.

CASE 11.—Hemorrhage in one lateral portion of the pons; sensory symptoms.

Female, æt. forty-four, was suddenly seized with giddiness and faintness, but did not lose consciousness. Gradual loss of power supervened in the left arm and leg, with loss of speech and dimness of vision. The next day, on admission to King's College Hospital, there were found paralysis of the right facial, spasm of the left orbicularis palpebrarum, paralysis of the left hypoglossus, and of the left arm and leg, most marked in the extensor muscles; anæsthesia (partial) and analgesia of the left arm and leg, but no anæsthesia of the face. The symptoms increased during the following two weeks, and paralysis of the right abducens and difficulty of deglutition developed. During the last six days there was constant twitching of the right extremities, and the bladder was paralyzed. She died eighteen days after the attack.

Autopsy.—A fusiform hemorrhage was found in the pons, extending along almost the whole length of the right side. It was 2 cm. long, and its anterior (cephalad) margin was 0.5 cm. caudad of the corp. quad. post., while its caudad margin was 1 cm. cephalad of the pyramid of the medulla. Its widest portion was situated at a depth of $1\frac{1}{2}$ cm. from the ventrad surface of the pons. It did not cross the raphé, but opposite its posterior extremity, in the left half of the pons, was a small clot the size of a hemp-seed, which lay at a depth of 1 cm. from the anterior surface. The clot was wedge-shaped, and its apex projected slightly into the iv. ventricle.—F. Willcocks : from Clinic of Dr. Johnson, King's College Hospital Report in *Brit. Med. Jour.*, 1881, i., p. 272.

CASE 12.—Tumor in one lateral half of pons; sensory symptoms.

Female, twenty-eight, was suddenly seized with an acute pain in the right side of the head, and lost her consciousness. On recovering from the attack, she was found to have total paralysis of the left hand, paresis of the left leg, and anæsthesia in both these limbs; also paralysis of the right motor v., right vii., right xii., and anæsthesia of the right half of the face. She was deaf in the right ear. Her speech was imperfect, and she had difficulty in swallowing. In this condition she lived fourteen months, and died of exhaustion.

Autopsy.—A semi-cartilaginous fibrous tumor was found in the dura and pia upon the right side of the pons and medulla oblongata. It extended from the point of exit of the v. backward for two inches, enclosing the right vertebral artery. The surface of the right crus cerebelli was softened, and so was the pons, upon which the tumor lay. It was incorporated with the substance of the right side of the medulla, and had produced softening throughout its tracts. The left side of the medulla was normal. The roots of all the right cranial nerves, from the v. to the xii., were compressed.—*Amer. Jour. Med. Sc.*, vol. xxviii., p. 106 (1841).

CASE 13.—Softening of pons; sensory symptoms.

Male, æt. seventy-four; a complete left hemiplegia of the arm and leg, with impairment of sensation gradually developed, and remained for one year before death, the right side never being affected. The slightest abrasion on the left side produced marked ulceration. There was no incontinence of urine or fæces. He died suddenly.

Autopsy.—The meninges were congested, and there was some effusion in the ventricles and under the arachnoid. In the falx cerebri were found four small pieces of bone one fourth inch thick. On the floor of the lateral and fourth ventricles granular excrescences resembling boiled sago were found. In the pons was a wedge-shaped area of brown softening. It spread over the anterior surface of the pons in its entire width, and one half an inch antero-posteriorly. Its apex extended on the right side to a depth of three eighths inch, and involved the longitudinal fibres. On the left side it was superficial, and involved only the transverse fibres.—J. B. Tuttle: *Phil. Med. Times*, xii., p. 350.

CASE 14.—Tumor of one half of pons; sensory symptoms.

Female, æt. seventeen; when admitted to the hospital was so stupid that no history could be obtained. On admission the following symptoms were found: complete paralysis and anæsthesia of the left half of the face; complete paralysis and partial anæ-

thesia of the right arm ; paresis and impairment of sensation in the right leg, though she could walk ; loss of smell in left nostril (tested by ammonia, which indicates anæsthesia) ; no paralysis of the tongue ; loss of hearing in the left ear ; total paralysis of the left eyeball, without strabismus ; conjunctiva and cornea acutely inflamed ; deglutition difficult, but appetite good ; no vomiting ; pulse rapid and weak ; temp. varied slightly from normal ; involuntary evacuations. Her mental faculties were so blunted that it was impossible to obtain reliable replies. She went into a condition of coma and died. (Duration not stated.)

Autopsy.—The pons was greatly distorted, and enlarged on the left side. Its surface was nodular, and its margins overlapped the medulla and crus. The left crus cerebri was also enlarged, and nodular. The left pyramid was compressed and indented, and the right pyramid pushed aside. The floor of the fourth ventricle was widened and bulged upward on the left side. The tumor was spherical in shape, occupied the left half of the pons, and had pushed the raphé to the right. No microscopic examination. No description of sections.—F. A. Miles : *Arch. of Medicine*, Oct., 1881.

CASE 15.—Tumor of one half of the pons ; sensory symptoms.

Male, æt. eight. Nov. 1, 1877, he suddenly fell down, and on being helped up could not stand, and trembled greatly. Three days subsequently he had a similar attack, but this did not interfere with his going to school all the month. His teacher noticed that he was very clumsy, but did not think him stupid. For three weeks prior to Dec. 12th he suffered from darting pains through his head, occasional vomiting, and weakness in his left hand. When examined Dec. 12th there were found occipital headache, right facial paresis, head inclined to the left, ptosis of left eyelid, paresis of left hand, and an unsteady gait. In a week the symptoms had increased in degree, the left pupil was dilated, but the ptosis had disappeared in the left and appeared in the right eyelid. His skin was cool—pulse 80, regular—appetite good. There was no intellectual disturbance. Dec. 29th.—Vomiting is now associated with the paroxysmal headache, and at the same time his bowels move. His speech is indistinct, and he is now very garrulous, talking constantly. During January his mind became much weakened ; his special senses were not impaired ; strabismus of the right eye appeared, the ptosis remaining ; right half of face became anæsthetic ; he could no longer stand or walk, and his head seemed too heavy for the muscles which support it. The

optic discs were normal. The left hemiplegia became complete, and his right foot was kept in motion constantly; the pulse became irregular and rapid, and on Feb. 10th he died of paralysis of the pneumogastric nerves.

Autopsy.—The right side of the pons was much larger than the left; soft and white, in its entire extent. The change extended along the middle cerebellar peduncle into the right hemisphere of the cerebellum. The fifth nerve could not be traced through the mass. This portion of the pons consisted of round and oval cells with few nuclei in a granular stroma, with many vessels. The tumor was a soft glioma. No sections, and no accurate localization.—J. C. Mackenzie: *Cincinnati Lancet and Clinic*, iv., p. 150.

CASE 16.—Abscess in one half of pons; sensory symptoms.

Male, æt forty-four, while suffering from an abscess of the arm developed suddenly paralysis of the right facial, anæsthesia of the right trigeminus, paralysis of the left hypoglossus, and anæsthesia of the left side of the body. On the next day swallowing and speech became difficult, and spasms of the left arm and leg began and were followed by paresis. Two days after respiration became difficult and he died.

Autopsy.—(By Huguenin.) An abscess was found in the right side of the pons, involving the dorsad half almost in its entire extent without involving either the inferior or superior peduncles of the cerebellum. In the lower part of the pons the abscess had broken through the deep transverse fibres and had reached the longitudinal fibres of the anterior portion.—Bircher, *Schweitzer ärztzl. Corresp. Bl.*, 1881, No. 4, quoted by Wernicke, *l. c.*, iii., p. 417.

CASE 17.—Tumor of one half of the pons; sensory symptoms.

Male, æt. thirty-two, syphilitic, was kicked in the head by a horse five years before the acute symptoms set in, but ever since that time had suffered from nocturnal headache, and occasional attacks of vertigo. Four weeks before his admission to the hospital he had a fall on the ice and hit his head. No ill effects of this fall manifested themselves until one week after it when he suddenly had an attack of vertigo and fell down. A few days after his sight became dim and he noticed a weakness of the right arm and leg. On admission it was found that his memory was defective so that history was uncertain. He was able to walk but his entire right side was paretic except the upper branch of the facial nerve. It was noticed that the right side of the forehead wrinkled more promptly than the left. Sensation was diminished

in the right limbs and in the left side of the face. Hearing, smell, and taste normal. Both eyes were constantly directed to the right and they could not be turned to the left of the median line. They were fixed and staring; pupils equal, and normal; in accommodation the axes converged slightly; the fundus was pale; the outline of the disc irregular, and the disc hyperæmic and opaque. The patient got worse gradually, and had to stay in bed on account of the vertigo. He had frequent attacks of epistaxis, and became anæmic and weak. On the day before death the limbs of both sides seemed equally paralyzed, and the mouth was drawn to the right side. There was decided loss of sensation in the right limbs and left side of the face. The eyes still deviated to the right and the pupils were small. He died of exhaustion. (Duration of illness not stated.)

Autopsy.—In the left squamous portion of the temporal bone a fracture of the skull—not depressed—was found, and here the dura was adherent, and on its inner surface was a small hard yellow nodule the size of a pea which had caused a slight depression in the left first temporal convolution at the junction of its middle and posterior thirds. A tumor one half inch in diameter was found in the body of the pons, causing a bulging of the floor of the fourth ventricle in its cephalad left part. The tumor was limited to the cephalad left quarter of the pons and did not cross the median line. It had pushed apart the anterior and posterior surfaces of the pons and had not disturbed their integrity(?). Microscopic examination showed it to be a gumma. There was descending neuritis of the optic nerves.—C. K. Mills, *JOUR. MENT. AND NERV. DIS.*, July, 1881.

CASE 18.—Hemorrhage in one half of the pons; sensory symptoms.

Male, æt. twenty-four, suffered from headache for several days, and then from numbness and formication in the left arm. On Oct. 14th, was suddenly paralyzed in the left extremities and left side of the tongue and right side of the face, and articulation was impossible. The left extremities were anæsthetic. The paralysis subsided somewhat in the extremities before his death, which occurred on Nov. 24th.

Autopsy.—A clot was found in the right half of the pons, just beneath the floor of the fourth ventricle. It extended nearly to the corpora quadrigemina. The clot was hard, yellowish, and fibrinous, and the surrounding substance was normal. Very small hemorrhages were also found, one in the centrum ovale and one

in the left corpus striatum.—Mavot : quoted by Wernicke, *Lehrbuch d. Gehirnr.*, II., p. 95.

CASE 19.—Tumor of one lateral half of pons; sensory symptoms.

Female, æt. forty, after suffering from headache, vertigo, and vomiting, with deafness and diplopia, developed gradually paralysis of the right abducens, of the left facial, of the left arm and leg, and total anæsthesia, with loss of muscular sense in the paralyzed extremities and in the left half of the trunk. Then followed attacks of pain shooting down the left arm and leg. The tongue protruded straight, and speech was perfect. The special senses were normal. Difficulty in chewing, with spasm of the masseters developed before death.

Autopsy.—In the substance of the right half of the pons a tubercular tumor was found, 2 cm. in diameter, which produced a bulging upward of the floor of the fourth ventricle. The tumor began at the cephalad border of the pons, and extended down to the inferior peduncle of the cerebellum, lying chiefly in the dorsad part of the pons near the floor of the fourth ventricle. The right middle peduncle of the cerebellum and the left half of the pons were normal. It was surrounded by a zone of softened tissue, which extended upward in the right crus cerebri nearly to the optic thalamus (ascending degeneration?). In the lower extremity of the right posterior central convolution upon its surface a second tubercle was found of the size of a pea.—Mavot : *Bull de la Soc. Anat.*, Paris, mars, 1875, quoted by Nothnagel, *l. c.*, p. 121.

CASE 20. Softening of one half of the pons; sensory symptoms.

Male, æt. thirty-three, had for several days a feeling of numbness, cold, and weakness in the right arm and leg, and headache. Then paralysis in these limbs developed suddenly without loss of consciousness. Examination showed paralysis of the entire right side, with anæsthesia, the face being included. Duration of illness not stated.

Autopsy.—A thrombosis of the basilar artery had produced an area of softening in the pons, which involved its entire left cephalad dorsad half. Details of the lesion are wanting.—Nothnagel : *Topische diagnostic d. Gehirnr.*, p 112.

CASE 21.—Sarcoma compressing the pons and crus; ataxia.

Male, æt. nine, began to use his right hand in an awkward manner in May, 1874, and in the course of a few months had lost power almost completely in the right arm. He then began to

suffer from headache, nausea, vomiting, double vision followed by strabismus, due to paralysis of the left abducens. He had occasional twitchings in the right hand, but no convulsions. During the next year the paralysis extended to the right leg, and there was a staggering gait. There developed ataxia and rigidity in the fingers of the paralyzed hand. Optic neuritis followed, and he suffered much from pain in the legs. His symptoms increased in severity until death, which occurred in April, 1880.

Autopsy.—A sarcoma was found upon the base of the brain, pressing upon the left crus cerebri and the pons. (Details wanting).—E. C. Seguin : "N. Y. Neurol. Soc. Rep.," *JOUR. MENT. AND NERV. DIS.*, Jan., 1882.

CASE 22.—Sarcoma of one half of the pons ; ataxia and sensory symptoms.

Male, æt. thirty-eight, fell and hit his head on Jan. 13th, and since that time has suffered from headache, vertigo so severe that he fell at times, and occasional attacks of nausea, and pain and weakness in his right shoulder. Was admitted to the hospital Feb. 23d, when a paresis of the right arm with numbness, impairment of speech and of deglutition, and "a distortion of the features, most marked on the right side of the face" (left facial paralysis ?), were found. His gait was reeling. His memory was so defective that the history was obtained with difficulty. He was habitually constipated. There was no change in his condition up to June, when he had two apoplectic seizures, occurring at an interval of two weeks, and died.

Autopsy (twenty-four hours, p. m).—The lateral ventricles were distended with serum. A tumor, of the size of a hickory nut, was found situated in the pons, and involving chiefly the dorsad surface of the left lateral half. A second tumor of the same size was found in the extreme posterior projection of the right lobe of the cerebellum. Microscopic examination showed them to be round-cell sarcomata.—G. Hart : *St. Louis Med. and Surg. Jour.*, vol. xiii., p. 571.

CASE 23.—Glioma of the pons ; ataxia.

Male, æt. six and a half, in Nov., 1873, fell on the back of his head. Two days after this he had a headache, and two weeks after his gait became irregular and ataxic, so that he reeled in walking. He was restless at night, and had headache frequently, but no vomiting or constipation. In Jan., 1874, his speech became indistinct and jerky, and his memory began to fail. In April he had become very stupid, and his speech was slow and

unintelligible though he tried to talk much. There was marked ataxia of the head and all the limbs, but no paralysis or anæsthesia. There was exophthalmos, and all the motions of the eyes were performed slowly, but there was no disturbance of vision. Hearing was good. Later in the month he had involuntary evacuations of urine, and the left pupil was dilated. In May, vomiting, intermittent pulse, dimness of vision, and paresis of the facial muscles began, and an ophthalmoscopic examination showed atrophy of the left disc, and congestion of the right disc. On the 8th he became comatose, and on the 9th he died of apnœa.

Autopsy.—The pons was found to be enlarged in all directions, measuring two inches long, two and a half inches wide, and one and a half inches thick. In a depression along its centre ran the basilar artery, which was much stretched. The tubercula quadrigemina were pushed up and flattened; the cephalad anterior portion of the fourth ventricle was occupied by a rounded swelling, which was firm on the left side and elastic on the right side. The anterior pyramids at their entrance into the pons were elevated, but their point of entrance was deep and normal. Microscopic examination showed the existence of small, round, and polygonal cells, with granular matter in a stroma of thickened neuralgia, throughout the pons. (Glioma.) There was an atrophy of the optic nerves. Lateral ventricles distended by serum.—Gibney : *Amer. Four. Med. Science*, July, 1875.

CASE 24.—Abscess compressing the pons; sensory symptoms.

Male, æt. twenty-one. In Sept., 1869, began to suffer from headache, and, on the 10th, left facial paralysis developed and remained. He entered Massachusetts Hospital Oct. 27th, when left seventh and twelfth paresis was noticed, and it was found that, in walking, he was dizzy and inclined to fall to the left. Subsequently, paresis of the left arm and leg developed, and, one month after, involuntary motions of the hand and arm occurred, with stiffness on passive extension. One week later, inco-ordination was so marked in his legs that he could not stand. The sensation of the limbs was not affected, but he had pain in the left side of the face and on the inner side of the left arm, and the left cheek and eyeball were anæsthetic. There was a gradual loss of vision, first in the left and then in the right eye. He had been deaf in the left ear for years. There was occasional flushing of the face. During three days in December he lay in a stupor. In January, nausea and vomiting began, the head ache became intense, and, at last, dysphagia developed, and he died Feb. 18, 1870.

Autopsy.—Pia strongly injected at the base; four ounces of serum in lateral ventricles. Brain-substance firm with numerous puncta vasculosa. Left side of the cerebellum was prominent and half as large again as the other side, the medulla and pons being pushed to the right. The left fifth, sixth, seventh, and eighth nerves were covered in, and destroyed by, a morbid growth; the ninth, tenth, and eleventh were stretched over the abscess to be described; twelfth normal. Along the side of the medulla was a swelling—soft and fluctuating, which was found to be an abscess containing green pus; its cavity was as large as a walnut, was lined with a membrane covered with villi. It extended upward and inward under the medulla and lower edge of the pons, not affecting the cerebellar peduncles except by pressure, seeming to lie between the lower and middle peduncles and to press them apart. The lower peduncle was spread out over its surface; it extended down almost to the lower part of the left cerebellar lobe, near the median line, the corpus dentatum not being affected. On the outer side of this abscess was a second one, as large as a hickory nut, separated from the first by a layer of cerebellar tissue, and occupying the upper part of the upper portion of the left cerebellar lobe. The fourth ventricle was larger than normal, being stretched over the abscess. The morbid growth was a glioma consisting of cells in groups and fibrous tissue.—S. G. Webber, *Boston Surg. and Med. Jour.*, vol. lxxxii, p. 289.

CASE 25.—Softening of the pons; hemiplegia, subsequently opposite facial palsy.

Male, suffered for four months from paresis of right arm and leg, with slight weakness of the right side of the face. He was then attacked with severe pain in his left jaw, which radiated from behind and below the left ear, over the side and front of the head and face, and, the next day, the left half of the face was found paralyzed. The pain continued for a month, and was associated with hyperæsthesia of the second branch of the fifth nerve. Reaction of degeneration not present. Two months after this attack, diabetes developed. All the symptoms persisted until nine months from the beginning of his illness, when he died suddenly. No mention is made of any disturbance of sensation, except in the second branch of the fifth nerve—on the left side.

Autopsy.—There was a depression of the convexity of the pons on the left side. Opposite to this, in the middle of the pons, was an irregular area of softening, situated in the pyramidal fibres, opposite and a little below the origin of the fifth nerve. Above, the

softening was in two foci, one of which was a cavity, the other being occupied by granular debris ; but, a little lower, these had blended into one of rather smaller size. The fibres of the fifth and seventh were both apparently undamaged, but the lesion in its lower part was close to the fibres of the seventh. In the middle of the pons, the left ascending sensory nucleus of the fifth presented two small foci of softening. The anterior pyramid of the left side was completely degenerated, and the degeneration was traced through the decussation to the opposite lateral column of the cord.—Gowers : *Brain*, pt. vii, p. 474.

CASE 26.—Tumor of the pons ; no sensory symptoms.

Male, æt. fifty-four, suffered for three months before his death from severe continuous headache, and two months before death noticed that his vision was disturbed by the fact that his eyes were constantly turned to the right. There was no diplopia. On examination, the head and eyes were found to be turned to the right, and the eyes, moved together, could not turn beyond the median line to the left, though the right eye alone could be turned for some distance to the left beyond the median line. Pupils equal and mobile. The position of the face was not due to paralysis or contracture of the muscles of the neck, and he could turn his head in any direction. *No paralysis or loss of sensation.* He had some dizziness, and staggered in walking. He died of pneumonia.

Autopsy.—No meningitis. No lesion in the hemispheres. A tumor was found in the pons at a level one cm. below (caudad) the apparent origin of the v. on the left side. It was so situated in front of (cephalad) the eminentia teres that it involved the course of the fibres of the left abducens, and by a little prolongation across the raphé toward the right side, interrupted the fibres of communication between the vi. and iii. centres. It did not involve the common nucleus of vi. and vii. It interrupted the posterior longitudinal bundle and the adjacent part of the raphé. No other lesion was found. The tumor was the size of a small nut. The position of the head was regarded not as compensatory for the position of the eyes, but as due to a severing of fibres joining the rotatory muscles of the head with their reflex centres.—Quioc : *Lyon Médicale*, 1881, July, Nos. 29, 30.

ANALYSIS OF THE SYMPTOMS.

The large number and varied character of the symptoms present in these cases make an analysis desirable ; and in

order to reach any conclusion from the study of the cases, as to the tracts conveying sensory impulses, such an analysis is necessary.

The Sensory Symptoms.

I. Disturbances of the tactile sense.

The tactile sense was disturbed to some degree in twenty-one cases. In cases 1, 2, 21, 22, 26 it was not affected. The distribution of the disturbance was as follows :

1. Anæsthesia of the right side of the face in cases 5, 7, 9, 10, 12, 15, 16, 20. Anæsthesia of the left side of the face in cases 3, 6, 10, 14, 17, 24, 25. Inflammation of the cornea coincident with the anæsthesia, occurred in cases 5, 10, 14.

In cases 3, 5, 6, 12, 14, 15, 16, 17, 24, 25, the anæsthesia of the face was on the same side as the lesion, and the lesion involved the ascending root of the trigeminal nerve in some part of its course in the medulla or pons, and did not involve the descending root. In cases 7, 9, and 20 the anæsthesia of the face was on the opposite side from the lesion. In cases 7 and 9 the lesion was situated so high in the pons (cephalad) as to involve the descending root of the trigeminus to some extent, but too high in the pons to affect the ascending root at all. The anæsthesia was slight in degree and was limited to the cheek and lip in case 7. It was well marked in case 9. In case 20 all details of the extent of the symptom and of the position of the lesion are wanting. In case 10 both sides of the face were anæsthetic, but the anæsthesia was limited to the upper branch of the trigeminus on the side of the lesion, and to the lower branch of the trigeminus on the side opposite to the lesion. In this case the lesion was so situated as to involve a small portion of the ascending root of the trigeminus and also a portion of the descending root of the trigeminus on the same side.

The conclusions to be reached from these facts are as follows :

(a) *Lesions affecting the ascending root of the trigeminus produce anæsthesia of the face upon the side of the lesion.*

(b) *Lesions affecting the descending root of the trigeminus produce anæsthesia of the face upon the side opposite the lesion.*

These conclusions confirm the statement of Meynert, that the descending root of the trigeminus decussates in the pons.

It may be noticed in passing that *a lesion, in order to produce any disturbance of sensibility in the face, must lie in the external lateral part of the formatio reticularis.* In the cases in which the face was not affected, the lesion lay elsewhere than in this portion. In the cases in which it was involved there was anæsthesia of the face.

2. Anæsthesia of the right limbs occurred in cases 3, 4, 6, 7, 14, 17, 20. Anæsthesia of the right arm alone occurred in cases 10, 22. Anæsthesia of the left limbs occurred in cases 5, 11, 12, 13, 16, 18, 19. In all these cases the anæsthesia of the limbs was upon the side opposite to the lesion, although the lesion was situated in all portions of the formatio reticularis from the lower limit of the medulla to the upper border of the pons. *It is therefore evident, first, that in the medulla and pons the sensory tract for each side of the body lies in the opposite half; and, secondly, that there is no decussation of the sensory tracts between the sensory decussation at the lower limit of the medulla and the upper border of the pons.* The facts are therefore opposed to the course of the sensory tracts described by Wernicke and Spitzka, in so far (1) as these tracts are supposed to undergo a second decussation between the sensory decussation and the internal capsule; and (2) as the sensory tracts are supposed to leave the medulla and to pass by way of the cerebellum around the pons. Lesions of the pons in any portion of its vertical extent (*i. e.*, between its cephalad and caudad limits) produce anæsthesia of the op-

posite half of the body. Therefore the sensory tracts must pass through the pons. Therefore they cannot pass through the cerebellar peduncles and the cerebellum unless we suppose that there are two independent sensory tracts, from each side to the cerebrum, a lesion in one of which suspends the function of the other also. It is very possible that some sensory impulses may pass to the cerebellum by the tracts described by Wernicke and Spitzka, and, setting up there a reflex action, be the means of exciting that organ to do its reflex work. But if so these are *not* the sensory impulses which pass to the higher cortical cerebral centres, or which are destined to awake in consciousness a perception of the sensation. The sensations which are perceived consciously are transmitted directly from the surface of the body through the spinal cord, medulla and pons into the internal capsule and thence to the cortical centres, and in their course undergo but one decussation. If that decussation is complete in the cord, the tract remains on the same side from the cord to the capsule. If that decussation does not occur in the cord it takes place in the sensory decussation at the lower part of the medulla.

In all these cases the lesion involved the formatio reticularis of the medulla or pons, and this was the only area of these parts which was affected in *every* case. By the term formatio reticularis I wish to include in the medulla (see fig. 5) the portion lying between the gray matter of the floor of the fourth ventricle and the pyramidal tracts in a dorso-ventrad direction, and between the interolivary tract and the ascending root of the trigeminal nerve in a lateral direction. In as much as there is no case on record in which the olivary body alone was destroyed, it is impossible to state whether it is to be included in the sensory area of the medulla. Its connection with the sensory parts of the cord has led Meynert to consider it a part of the

sensory tract. The question cannot be decided from pathological facts. In the pons the *formatio reticularis* (see figs. 6, 7) lies between the gray matter of the floor of the fourth ventricle and the lemniscus, in a dorso-ventrad direction, and between the raphé and the external border of the pons, in a lateral direction. There is one case on record (case 26) in which a lesion limited to the inner portion of the *formatio reticularis* near the raphé in the most cephalad quarter of the pons, and affecting the post. longitudinal bundle chiefly, produced *no* sensory symptoms. It is possible, therefore, that the sensory tracts for tactile sensation nowhere in medulla or pons approach the raphé, but the number of cases is too few to warrant any general positive statement.

That the sensory tract for the tactile sense lies in the *formatio reticularis* alone will be more conclusively demonstrated after a review of the other sensory symptoms.

When the cases in which anæsthesia of the face was associated with anæsthesia of the limbs are compared with the cases in which the face alone or the limbs alone were affected, and the situation of the lesion in these three classes of cases are compared, the following diagnostic points can be deduced :

1. *If in any case anæsthesia of one side of the face occurs (not due to neuritis of the trigeminus or to cerebral lesion), the lesion lies in the medulla or pons, in the outer third of the formatio reticularis. Its position in this part is to be determined by the other symptoms present ; for, if it is situated high up (cephalad) in the pons, it will be on the side opposite to the anæsthesia, and if it is situated low down (caudad) in the pons or in the medulla, it will be on the same side as the anæsthesia.*

2. *If in any case anæsthesia of the limbs occurs (not due to cerebral lesion), the lesion lies in the medulla or pons, in the inner two thirds of the formatio reticularis, and upon the side opposite to the anæsthesia ; or in the spinal cord.*

3. *If one side of the face and the limbs of the opposite side are anæsthetic, the lesion affects the entire lateral extent of the formatio reticularis, and lies in the medulla, or in the pons, below the point of union of the ascending and descending roots of the fifth nerve.*

4. *If the face and limbs of the same side are anæsthetic, the lesion lies in the brain at a point higher than the junction of the ascending and descending roots of the fifth nerve in the pons. Its position is then to be determined by other symptoms. It may involve the entire formatio reticularis in the upper pons, or crus cerebri; it may be situated in the posterior part of the internal capsule; it may lie in the centrum ovale destroying the radiation of sensory fibres from the internal capsule; it may be in the sensory area of the cortex in which all these tracts terminate.*

See Diagram 1.

II. Disturbances of the sensation of pain.

The sense of pain was impaired in cases 4, 5, 6, 9, 10, 11, 19, 20. The subjective sensation of pain was present in cases 19, 21, 24. In a number of the cases no test of this sensation was made. The sensation of pain was found to be normal in cases 1, 2, 7. The distribution of the disturbance of the sensation of pain corresponded in all these cases with the distribution of the anæsthesia, and therefore the conclusions drawn from the disturbances of the tactile sense apply to those of the sense of pain. In the three cases in which the sense of pain was normal the tactile sense was also normal in two, and but slightly affected in the third. In all these three cases the lesion was chiefly in the interolivary tract and lemniscus, and only in the third was the formatio reticularis affected at all. No case of disturbance of the sensation of pain *alone*, accompanied by an autopsy, is on record.

Therefore, until further evidence is brought forward, it

must be accepted that *sensations of pain are transmitted through the formatio reticularis*, and have the same course as tactile sensations.

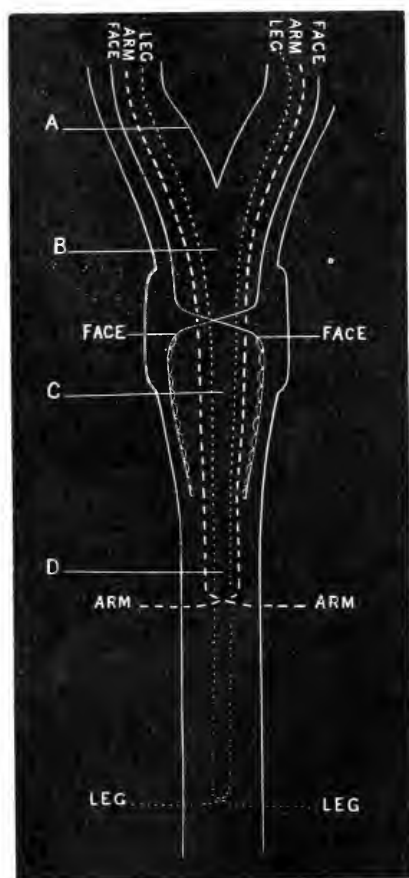


DIAGRAM I.

DIAGRAM OF TRACT CONVEYING TACTILE SENSATION FROM THE SURFACE TO THE INTERNAL CAPSULE.

- A.—Lesion in Capsule producing Hemianæsthesia.
- B.— " " Crus " "
- C.— " " Pons (below upper third) or in Medulla producing Alternating Anæsthesia.
- D.—Lesion in Cord producing Spinal Hemianæsthesia.

III. Disturbances of the sensation of temperature.

The sensation of temperature was impaired in cases 4, 5, 6, 7, in all of which cases the disturbance occurred in the

anæsthetic parts. In the remainder of the cases no tests for this sensation were applied. No conclusion can, therefore, be drawn as to the course of the tracts conveying this sensation, although the fact that *disturbances of the sensations of pain and temperature usually occur together* gives a certain probability to the hypothesis that these sensations follow the same tract in both cord, and medulla, and pons.

Subjective sensations of heat and cold were present in a number of cases: of cold, in cases 3, 7, 15, 20; of heat in 6, 10, 24. These subjective sensations had no relation to the anæsthetic parts, but were general, extending to the normal as well as to the affected limbs. In the cases in which the subjective sensation was that of heat, there was also a flushing of the parts in which the heat was felt. It seems probable, therefore, that in these cases the vaso-motor centre in the medulla, the existence of which, in animals, is undoubted, was involved. Foster¹ locates this centre in the medulla in a small area lying just above the calamus scriptorius, and it is a noticeable fact that in these three cases the lesion lay exactly in this region; while in three out of the four cases in which the sensation was one of cold, the same area must have been, to some extent at least, involved, and in two cases (cases 2 and 5) in which there was no subjective sensation, but in which there was other evidence of vaso-motor disturbance, the same area was affected. We have, therefore, eight cases in which *vaso-motor disturbance was associated with a lesion in the upper half of the medulla*, and thirteen cases in which this part was not affected, and in which no vaso-motor disturbance occurred. *The localization of the vaso-motor centre, therefore, which was reached by physiological research is confirmed by pathological observation.*

IV. Disturbances of the muscular sense and consequent ataxia.

¹ "A Text-Book of Physiology." M. Foster, 3d edition, page 218.

Ataxia was present in cases 1, 2, 4, 5, 6, 7, 10, 15, 17, 19, 21, 22, 23, 24.. In cases 1, 2, ataxia was not accompanied by other sensory symptoms. In cases 7, 10, 15, ataxia was marked while the sensory symptoms were slight, in two of these cases the anæsthesia being limited to the face. In the remainder both muscular and tactile senses were affected.

In the cases in which ataxia occurred without affection of tactile sensibility the lesion affected either the interolivary tract in the medulla, or its continuation, the lemniscus, in the pons.

In the cases in which affection of tactile sensibility occurred without ataxia, these parts were not involved in the lesion.

In the cases in which both ataxia and tactile anæsthesia occurred, these parts as well as the formatio reticularis were involved. *The conclusion is warranted that the muscular sense is transmitted along the sensory tracts which lie in the interolivary tract and lemniscus.* In the spinal cord the sensation of muscular sense ascends upon the same side upon which it enters, as we have already seen. But lesions of the interolivary tract and lemniscus produce ataxia in the limbs of the side *opposite to the* lesion. Therefore, *the sensations of muscular sense must decussate in the medulla. They do decussate in the sensory decussation of the medulla*, as is proven by the facts afforded by cases 4, 5, 7, 8, in which a descending degeneration was traced from a lesion of the lemniscus downward along the interolivary tract to the level of the sensory decussation, and in one case through the sensory decussation to the nuclei gracilis and cuneatus.¹ This course, therefore, corresponds to that of the pyramidal motor tracts.

¹ Kahler (*Prager med. Woch.*, Jan., 1879) was the first to connect the symptom ataxia with a lesion of the interolivary tract. Meyer (*Arch für Psych.*, Feb., 1882) reported his case without alluding to Kahler. Senator (*Arch. für Psych.*, Oct., 1883) cited both these cases and added one of his own, and ascribed the ataxia to a lesion of the lemniscus as well as of the in-

The sensations of pressure and of the location of a limb are conveyed by the muscular sense and are included under it. In the cases in which they were tested and found wanting, cases 1, 4, 5, 6, 7, the disturbance was limited to the parts which were ataxic.

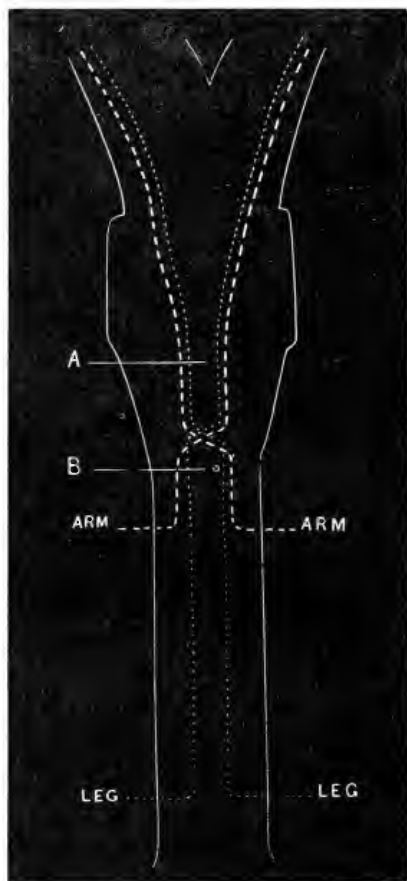


DIAGRAM II.

DIAGRAM OF TRACT CONVEYING MUSCULAR SENSE FROM THE LIMBS.

A.—Lesion above the decussation producing ataxia of opposite side.

B.—Lesion below the decussation producing ataxia of the same side.

terolivary tract. Spitzka. (*Amer Jour. Neurology*, Feb., 1884,) arrived at the same conclusion from his own case and quoted Meyer, but does not allude to Senator. Each of these observers, therefore, may justly claim the independent discovery of the same fact. All the cases hitherto published are here collected for the first time.

The results reached from the analysis of these cases are as follows:

1. The sensory tracts in the medulla are the *formatio reticularis* and the *interolivary tract*.
2. The sensory tracts in the pons are the *formatio reticularis* and the *lemniscus*.
3. The sensory impulses which have decussated in the spinal cord are conducted along the sensory tract through the medulla pons and crus to the internal capsule without recrossing the median line. These are the sensations of touch, pain, and temperature, and they are transmitted through the *formatio reticularis*.
4. Those sensory impulses which have not decussated in the spinal cord cross the median line in the sensory decussation of the medulla, and pass upward through the *interolivary tract* to the *lemniscus*, in which they ascend to the internal capsule. These are the sensations included under the term *muscular sense*.
5. If any sensory impulses pass to the cerebellum, they are only those whose result is to awaken reflex action, and they are not the sensory impulses whose reception in the cortical cells is capable of awakening a conscious perception of the sensation. The sensations consciously perceived do not pass through the cerebellum on their way to the cerebrum.

The course of the sensory tracts thus established by pathological cases is the same as that which has been determined by the anatomical and embryological researches of Flechsig, by the one experiment made in accordance with the method of Gudden, and by the investigation of the microcephalic brains in which the motor tracts were absent. It may therefore be accepted as the only one possible in the medulla and pons.

But if it be accepted that the *muscular sense* passes

along the interolivary tract and decussates in the medulla, while no other sensations so decussate, we may trace this tract downward into the cord, and thus determine the function of a portion of the cord. The interolivary tract is made up partly of fibres from the nucleus cuneatus and partly from fibres from the nucleus gracilis, and these are respectively the terminal stations of the columns of Burdach and of Goll. It is therefore probable that in these columns the muscular sense is transmitted, the column of Goll transmitting this sense from the legs, and the column of Burdach transmitting it from the arms. This hypothesis is substantiated by the fact that these are the columns which are diseased in locomotor ataxia, in which the most marked and constant symptom is a loss of the muscular sense. This does not exclude a transmission of touch also in these columns, since both columns are connected with the formatio reticularis, as well as with the interolivary tract. It makes it probable that Schiff's conclusions regarding animals are true as regards man, and that *in the spinal cord sensations of touch and of the muscular sense pass up in the posterior columns*, while sensations of temperature and pain pass up in other sensory tracts—viz., in the gray matter or in the direct cerebellar columns.

But it is improbable that sensations of pain and temperature pass in the direct cerebellar columns: first, because these columns only commence in the cord above the level of the first lumbar nerve at the level of the Clarke column of gray cells in the posterior median gray matter; and secondly, because these columns go to the cerebellum, while lesions of the cerebellum do not interfere with sensations of pain and heat or cold, while, on the other hand, such sensations are affected in diseases of the pons, through which the direct cerebellar columns do not pass. For these reasons it is probable that *sensations of temperature and pain pass up in the gray matter of the spinal cord*.

What, then, remains as a function for the direct cerebellar columns? I am not aware that any hypothesis has been offered, and where proofs are wanting, hypotheses are worth little. But anatomy and pathology combined seem to indicate a possible function for these columns, as follows :

1. The columns arise (Flechsig) from a set of cells (the Clarke column) whose extent is coextensive with the entrance into the cord of nerves which come from the thoracic and abdominal viscera, and which form a centripetal path for impulses originating within the great cavities of the body.
2. Diseases in the cord which interfere with the function of the direct cerebellar columns (viz.: transverse myelitis—myelitis of any kind) are attended by an irregular action of the organs within the great cavities, especially within the abdomen. The gastric crisis of locomotor ataxia and the habitual constipation of myelitis are examples in point.
3. Diseases of the cerebellum are known to give rise to disturbances of function of the viscera of the great cavities—especially of the abdominal viscera; indigestion, vomiting of a peculiar kind, obstinate constipation, polyurea, albuminuria, etc., being well-known symptoms of cerebellar disease.¹

For these reasons I would advance the hypothesis that among other functions of the cerebellum that of a reflex centre for the proper regulation of the functions of vegetative life is one, and further that the *path of impulses between the vegetative organs and this reflex centre lies in the direct cerebellar columns of the spinal cord* as far as centripetal impulses are concerned.²

¹ It is a noticeable fact that these symptoms of cerebellar disease, *unlike the ataxia*, are not produced by lesions of the vermiform lobe *alone*, but occur when the cerebellar hemispheres are the seat of lesions, such as abscess and softening from embolism and thrombosis, which neither increase the intra-cranial pressure nor affect in any way directly the floor of the fourth ventricle and the pneumogastric centres there or in the flocculus.

² The cases here collected present many interesting features aside from those

SENSORY TRACTS IN THE CRURA CEREBRI.

The formatio reticularis and lemniscus continue upward through the tegmentum of the crus lying external to the red nucleus, and pass into the posterior part of the internal capsule. It is the opinion of Flechsig that the lateral lemniscus passes through the internal capsule into the corona radiata of the tegmentum and thus directly to the cortex. Roller, Forel, and Wernicke trace it in part at least to the laminæ medullares of the optic thalamus and make it end in this ganglion. Fibres from the formatio reticularis pass

concerning the sensory tract. The discussion of these symptoms, and of the light which they throw upon the normal functions of the medulla and pons, cannot be entered upon here, as these are subjects aside from the present purpose. The symptoms are, however, analyzed, and are reserved for consideration at another time.

1. Paralysis of the iii. nerve, right. Case 5.
" " " left. Cases 9, 14, 15.
2. Paralysis of the vi. nerve, right. Cases 5, 11, 19, 26.
" " " left. Cases 1, 4, 14, 15, 21.
3. Conjugate deviation of the eyes to the right. Cases 6, 9, 26.
" " " left. Cases 5, 17.
4. Ptosis. Cases 7, 9, 15.
5. Nystagmus. Cases 1, 4.
6. Diplopia. Cases 4, 6, 9, 19, 21.
7. Myosis. Case 15.
8. Mydriasis. Cases 7, 9.
9. Dimness of vision. Cases 7, 11, 17, 21, 23, 24.
10. Inflammation of the cornea. Cases 5, 10, 14.
11. Paralysis of vii. nerve, right. Cases 4, 5, 11, 12, 15, 17, 18, 20, 23.
" " " left. Cases 6, 9, 10, 14, 17, 19, 22, 23, 24, 25.
12. Trismus. Cases 9, 10, 17.
13. Deafness in the right ear in cases 10, 12; in the left ear in cases 9, 14, 24.
14. Tinnitus aurium in case 5.
15. Difficulty in swallowing in cases 2, 3, 5, 6, 7, 11, 12, 14, 16, 22, 24.
16. Difficulty in speaking, not aphasia, in cases 2, 3, 4, 7, 10, 11, 12, 15, 16, 18, 22, 23.
17. Paralysis of the XII. nerve, right, in cases 2, 4, 6, 7, 10, 12, 20.
" " " left in cases 2, 5, 6, 11, 16, 18, 24, 25.
18. Paralysis of arm and leg, right, in cases 6, 10, 14, 15, 17, 20, 21, 22, 23.
" " " left, in cases 5, 11, 14, 16, 18, 19, 24.
19. Increased knee-tendon reflex, right, in cases 6, 7.
" " " left, in case 5.
20. Absence of the skin reflexes, right, in cases 6, 7.
" " " left, in case 5.

Situation of the Lesion.

On the right side in cases 2, 5, 11, 12, 13, 15, 16, 18, 19, 23.

" left " " " 1, 2, 3, 4, 6, 7, 8, 9, 10, 14, 17, 20, 21, 22, 24, 25.

On both sides in case 2.

In the medulla alone in cases 1, 2, 3, 6, 9, 24.

In the pons alone in cases 10, 11, 13, 14, 15, 16, 17, 19, 20, 21, 22, 25, 26.

In both medulla and pons in cases 4, 5, 7, 8, 12.

to the substantia nigra of the crus and end in it. Others pass to the laminæ medullares of the optic thalamus and end in it. Others still unite with fibres from the red nucleus, and leave the tegmentum in a large bundle which passes through the internal capsule in its posterior part and radiates toward the cortex (the Haubenstrahlung of Flechsig). No attempt has been made to assign functions to the various bundles of fibres issuing from the tegmentum.

Cases of lesion of the crus are rare, and those on record are chiefly lesions of the pes and not of the tegmentum. Nothnagel was able to cite but nine cases, and his conclusion as to the sensory tracts is merely negative. They do not lie in the inner two thirds of the pes, as lesions there give rise to motor symptoms only.

Two cases are on record in which the red nucleus has been diseased, and in neither of these was sensation affected.¹ The red nucleus is in anatomical connection with the opposite superior cerebellar peduncle, as is proven by the fact that atrophy of one cerebellar hemisphere is accompanied by atrophy of the opposite red nucleus. Lesions of the corpora quadrigemina usually involve the red nucleus, and in these there is no disturbance of general sensation.² Such lesions may produce incoördination which indicates a functional relation between the red nucleus and the cerebellum. There is, therefore, no reason to assign sensory functions to the red nucleus, or to suppose that the sensory tracts pass in the inner half of the tegmentum.

It is not probable that the sensory tracts pass in the outer third of the pes, for this part consists of fibres which connect the cerebrum and cerebellum, and is absent when either the cerebrum or cerebellum is absent.³

¹ Kahler: *Arch. f. Psych.*, x. Kahler and Pick: *Zeitsch. f. Heilk.*, ii., p. 305.

² See Wernicke: "*Lehrbuch d. Gehirn.*," vols. ii. and iii., sections on Corp. Quad.

³ Compare Flechsig's case of deficient cerebellum with my case of deficient cerebrum, in both of which this part was absent.

It is therefore probable that in the crura the sensory tracts lie in the outer half of the tegmentum, in which part lie the formatio reticularis and lemniscus, which have been shown to be the sensory tracts in the pons. There are no pathological facts to prove or to oppose this hypothesis. It is reached by a method of exclusion, but until further facts are offered may be accepted.

SENSORY TRACTS IN THE BRAIN.

I.—*Anatomical.*

The formatio reticularis terminates at the upper level of the crura, and from this point fibres pass into the posterior third of the internal capsule. Into this part of the capsule the lemniscus also passes. These tracts here become indistinguishable, but are known to lie in the internal capsule, as they did in the pons, posterior to the motor tract. It is well-known that lesions of the posterior part of the internal capsule produce anæsthesia of the opposite side of the body; a pathological fact which confirms the course of the sensory tract through this part.

At the upper level of the internal capsule its fibres radiate toward the cortex. The point of radiation of the fibres which form the sensory tract is known as the "carrefour sensitif." This is just opposite the middle of the optic thalamus and at its upper level. Here, too, lesions produce hemianæsthesia.

Above the "carrefour sensitif" the nerve fibres from the capsule become so mingled with radiating fibres from the optic thalamus that in an adult brain they cannot be distinguished. Flechsig has found, however, that the former obtain their medullary sheaths at an earlier date than the latter in foetal life. He was thus able to trace the sensory tract. He affirms that it approaches the posterior and inner border of the motor tract, and in the corona radiata passes to the cortex of the parietal lobe where it ends in

the convolutions lying posterior to the fissure of Rolando, and anterior to the occipital lobe of the brain.

From a review of the facts just stated it is evident that a direct anatomical connection can be traced from the surface of the body to the parietal cortex of the brain, by means of the sensory nerves, the sensory nerve-tracts in the cord, medulla, and pons, and in the interior of the brain itself.

It is admitted that no one nerve fibre can be followed from a point on the surface to a point in the brain. In fact it seems to be a law of nervous transmission that impulses are always modified in their course by passing into and then issuing from nerve cells. In the course of sensory impulses the cells in the gray matter of the cord, and probably those in the gray matter of the medulla, crus, and optic thalamus are traversed by some, if not by all of them. But however such cells may modify the impulse they do not interrupt it, and their presence does not affect the fact of a connection between the surface of the body and the cortex of the brain. The most considerable collection of cells in this tract is the optic thalamus, and for many years it has been thought to take a large part in the reception and transmission of sensory impressions. Recent investigation of cases of thalamus disease by Nothnagel¹ and Wernicke² has thrown some doubt upon its sensory function, as far as the sensations of touch, temperature, and pain are concerned. And it is still an open question whether the sensory symptoms occurring in its diseases are due to an implication of sensory centres, or to an affection of the sensory tracts passing along its periphery in the internal capsule. Until further facts are offered, however, the conclusions of Flechsig must be accepted, since these are the only ones well established and of value.

Anatomical study, pursued by the various methods of in-

¹ Nothnagel : "Topische diagnostic d. Gehirnk."

² Wernicke : *L. c.*, vol. ii. and iii.

vestigation at present known, leads, therefore, to the conclusion that the tracts conveying sensations of touch, pain, temperature, and the muscular sense, pass to the parietal region of the cortex of the hemispheres.

It is not known whether *all* the sensations from one side of the body pass to the opposite hemisphere of the brain. The pathological facts here cited would indicate that they do. It must be remembered, however, that for many years, and until a very recent date, it was supposed that a lesion of one hemisphere produced a paralysis upon the opposite side of the body *alone*. It is now admitted that, in as much as each hemisphere is connected with both sides of the body by motor tracts—the larger of the motor tracts decussating, and the smaller not decussating in the medulla,—a lesion of one hemisphere produces paralysis upon the opposite side of the body, and a certain amount of weakness upon the same side of the body. It has recently been established that a lesion of one hemisphere in the visual area produces, not blindness in the opposite eye as was formerly supposed, but a certain degree of blindness in both eyes, that in the opposite eye being greater in extent than that in the eye of the same side.¹ The olfactory fibres pass from each bulb to both hemispheres. The argument from analogy would therefore indicate that, as regards other sensations, each half of the brain is in relation with both sides of the body, its connection with the opposite side being more extensive than that with the same side. The probability therefore is, that *all* the sensations from one side of the body do *not* pass to the parietal cortex of the opposite side; but that while the majority so pass, a portion go up to the cortex of the same side from which they come. This probability is somewhat strengthened by the fact that

¹ See Mauthner: "Vorträge aus des Gesamtgebiet der Augenheilkunde." "Gehirn und Auge," Wien, 1883. Also Wernicke: *l. c.*, vol. i., p. 69. Also Starr: *Amer. Jour. Med. Science*, Jan., 1884.

complete hemianæsthesia from cortical disease is far less common than complete hemiplegia, a fact which would find an easy explanation if it could be shown that both sides of the body were connected by sensory tracts with each half of the brain. A more careful and accurate examination of future cases may furnish facts to decide this question. At present it can only be stated that a connection has been established between the sensory tracts and the parietal regions of the brain.

II.—*Physiological.*

The researches of physiologists in determining the functions of the brain have been productive of the most successful and brilliant results ever achieved in that department of science. From the beginning of investigation of this subject by Fritsch and Hitzig in 1870 to the latest experiments of Munk in the present year, a continuous succession of interesting and valuable facts have been discovered. This is not the place to trace the history of these discoveries, or to give in detail the methods pursued. The results which bear upon the subject in hand—the location of the sensory areas in the cortex—must be considered briefly.

Ferrier was the first to attempt to determine the sensory area of the cortex. Recognizing the fact that in animals no reliable information of sensory disturbance due to *irritation* of the cortex could be obtained, he resorted to the method of extirpating various areas of the cortex with a view of producing anæsthesia. As the result of several experiments, one of which is given in detail,¹ he concluded that the tactile centre was to be found in the hippocampus major and the uncinate convolution, in the monkey. As he admits that other regions, especially the occipital cortex and part of the corona radiata, were injured in the course of the experiment, the result cannot be accepted as con-

¹ Ferrier : " Functions of the Brain," p. 179.

clusive. That, in the monkeys operated on, tactile sense was destroyed, may be admitted, though it is not stated whether the loss of tactile sense was permanent or only temporary. But since, in destroying this sense, several regions of the brain were destroyed and the internal capsule was injured, it seems somewhat arbitrary to limit the function to one of the regions destroyed. That the tactile centre in man lies in the hippocampal region cannot be admitted; for, first, we have already seen that the sensory fibres do not pass to this region; and second, we shall see, in the pathological section, that lesions of this region do not produce anæsthesia.

The conclusion of Ferrier therefore stands without anatomical or pathological support.

It is probably from a repetition of his earlier experiments that Ferrier has been recently led to change his opinion. In his last announcement (Nov., 1883, Oration before the Med. and Chirurg. Society, London, rep. in *Brit. Med. Jour.*, Nov. 30, 1883) he says: "I have all along held, and hold, both on experimental and on clinical grounds, that the centres of common sensation, including muscular sensibility, are anatomically distinct from those of motion, and are situated in the subcortical region." He thus retracts the statement that sensory centres are situated in the hippocampal region and refuses to locate them on the cortex at all.

The experiments of Munk are more numerous, more carefully conducted, and more complete in observation and description, and his conclusions conform to both anatomical and pathological facts. His method is to extirpate limited areas of the cortex in various regions, and after the animal has entirely recovered from the temporary effects of the operation, to determine what functions are impaired. The animals used were dogs and monkeys. Munk has found

that the area of common sensation (Fühlsphäre)—including sensation of pressure, location of a limb, muscular sense, and touch, lies in the central region, including the anterior and posterior central convolutions, and in the adjacent portions of the cortex. He divides this area into special regions, for the hind leg, fore leg, head, eye, and ear muscles, neck and body. These regions coincide with, but are somewhat more extensive than, the corresponding motor centres for these parts. Destruction of any one of these regions, therefore, produces paralysis and anæsthesia in the parts with which it is connected. The paralysis Munk ascribes to the loss of the memory of the combination of impulses necessary to produce the desired motion (innervationsgefühl and bewegungsvorstellungen). The anæsthesia persists for ten weeks after the extirpation of a single centre, after which time the animal recovers, the adjacent region taking up the function of the one destroyed. If the entire area, however, is extirpated, the anæsthesia is permanent and complete. To produce complete anæsthesia the entire parietal cortex and a portion of the frontal cortex, must be destroyed. The sensory portion of the cortex is therefore assigned by Munk to the parietal area and central region of the brain.¹ This conclusion is in harmony with the anatomical fact already stated, that this portion receives the sensory tracts.

The experiments of Goltz,² though interpreted by him as contradictory to the theory of localization, really substantiate indirectly the conclusion of Munk as opposed to that of Ferrier.

Goltz extirpated the greater part of the external convex surface of the hemispheres, leaving the portions at the base of the brain intact. He thus destroyed Munk's Fühlsphäre

¹ Munk's conclusions are to be gathered from his reports to the Physiol. Soc. of Berlin, to be found in *Pflüger's Arch. f. Physiologie*.

² Goltz: "Verrichtungen des Gehirns."

but did not injure the hippocampal region—Ferrier's area of touch. According to his description of the animals thus experimented upon, there was at first a decided loss of sensation to touch, pain, and the muscular sense, though he claims that this was not complete, and that after a time the animal recovered. While his experimental results are interpreted by him as contradicting the results of other experiments in favor of localization, it is evident that, as regards this special subject of the localization of the sensation of touch, his results are in accord with those of Munk and are opposed to those of Ferrier.¹

The most recent experiments to determine the sensory centres of the cortex are those of Tripier, of Montpellier, France, reported in the *Revue Mensuelle de Médecine*, 1880–1881. Like other experimenters, Tripier has extirpated various areas of the cortex, and observed the results. He reaches the same conclusion as Munk, and affirms the existence of sensory centres on the so-called motor area. He finds that the sensory area for a definite limb coincides with, but is more extensive than, the motor area for the same limb. He thus arrives at a similar arrangement of sensory areas to that already described by Munk.

At the same time that Tripier was working in France, Moeli in Berlin was investigating the same subject. His results are published in *Virchow's Arch.*, Bd. 76, and coincide with those of Munk and Tripier.

Thus three experimenters, working independently, arrived at the same time at a similar conclusion, viz. : that the motor and sensory areas of the brain for any one limb coincide.

But physiological experiment, however precise, affords information concerning the functions of the brain in animals only. It is solely by means of the study of clinical cases

¹ This is not the place to discuss the merits of Goltz' objections to localization. The reader is referred to the *Journal of Physiology*, Dec., 1883, for a complete review and careful criticism of the respective results of Goltz and Ferrier.

that results can be reached in the case of man. The final appeal must, therefore, be made to pathology.

III.—*Pathological.*

Are there any cases on record in which the occurrence of sensory symptoms during life must be ascribed to a limited cortical lesion discovered at an autopsy and accurately localized? When Nothnagel wrote his great work "*Topische diagnostic der Gehirnkrankheiten*," in 1879, he was obliged to say: "Disturbances of sensation have as yet no bearing upon the diagnosis of cortical lesions." The stimulus given to the observation of brain lesions by Nothnagel's work was productive of many careful records of cases, and in 1880 Exner was able to find twenty two cases in the journals, in which sensory disturbance had been associated with cortical disease. In all of these cases he found the lesion to be within or very near to the central or motor region.¹ No general collection of cases of cortical lesion has been made since that of Exner; the cases collected by Charcot (*Rev. de Méd.*, 1883) being studied solely from the point of view of motor symptoms, and no mention being made of the condition of sensation in the majority of the cases. Exner did not have access to American journals when making his collection. I have, therefore, examined the American journals for the past twenty years, and the chief European journals published between Jan., 1880, and Jan., 1884, and have found a large number of cases in which sensory symptoms have been noticed, and in which a *post-mortem* examination has shown a lesion in the cortex of the brain. It is to the study of these cases that we at once proceed, the cases being first cited and then analyzed.

In the cases chosen there was but *one lesion of limited extent, situated in the cortex of the brain, and not affecting the*

¹ In sixteen of Exner's cases the central convolutions were actually involved. In the others the parietal convolutions near the post-central conv. were affected.

basal ganglia. These are the only cases from which conclusions can be legitimately drawn, and therefore all others are ruled out from consideration, although a large number were found in which sensory symptoms were associated with extensive or multiple lesions of the cortex.¹

ANALYSIS OF THE CASES.

In all the cases here collected sensory symptoms were present. In all these cases an autopsy showed a diseased condition, limited to the cortex of the hemisphere of the opposite side, in the anterior or posterior central convolutions, or in the convolutions of the parietal lobules,² all other parts of the brain being normal.

The sensory symptoms were of different kinds, which may be classified into (1) symptoms of irritation of the cortex, including hyperæsthesia, hyperalgesia, paræsthesiæ, and subjective pain, and (2) symptoms of destruction of the cortex, including anæsthesia, analgesia, and ataxia. In a number of the cases, the first class of symptoms were succeeded by the second class in the course of the disease.

1. Sensory symptoms indicating irritation of the cortex.

These occurred in fourteen cases. In some the irritation was temporary, occurring just before or just after an epileptic convulsion. In these cases the condition was one of cortical epilepsy, and the diagnosis was confirmed by the autopsy, the local lesion being found in that part of the motor area corresponding to the muscles which first became convulsed. It is therefore evident that the sensory aura of cortical epilepsy may be brought into connection with cortical disease in the sensory-motor area of the brain.

In some of the cases the irritation was permanent, being due to disturbances of circulation in the cortex set up by a

¹ The American cases in this collection are cited by me in full in the *Amer. Jour. of the Med. Sci.* for July, 1884.

² For convenience and to avoid repetition, these convolutions are included in the term "*sensory-motor area*."

CASE	SEX	AGE	SYMPTOMS.	DURATION.	LESION.	SITUATION.	REPORTED BY.
1	M.	67	Anæsthesia l. face and arm.	4 mos.	Softening from thrombosis.	A. C., P. C.; m. 1-3.	Petrina: <i>Zeit. f. Heil.</i> , li. 388.
2	M.	30	" r. "	3 mos.	Hemorrhage.	Sylvian Reg. A. C. l. 1-3.	" " " " " " " " " " " "
3	F.	33	" " "	3 wks.	Tubercle.	3 P. C. l. 1-3.	" " " " " " " " " " " "
4	M.	39	Analgnesia r. "	4 mos.	Gumma.	P. C.; m. 1-3.	Sands: <i>Med. Mens.</i> , April, 1883.
5	F.	20	" " " and body.	3 wks.	" "	A. C.; l. 1-3 F.	Petrina, l. c.
6	F.	28	Analgnesia r. "	2 yrs.	Softening.	P. C., m. 1-3; Ang. Gy.	Dreschfeld: <i>Practitioner</i> , May, '75.
7	M.	28	" " "	2 yrs.	Tubercle.	A. C., P. C.; m. 1-3.	Edinger: <i>Arch. Psych.</i> , x, 93.
8	F.	18	Hyperæsthesia of r. arm and leg.	5 mos.	Sarcoma.	Sup. Par. Lob.	Monakow: <i>Arch. Psych.</i> , xi, 626.
9	M.	28	Anæsthesia of r. arm.	10 days.	Abscess.	A. C., P. C.; m. 1-3.	Bender: <i>Diat. med. Woch.</i> , No. 450, 1884.
10	F.	27	" l. "	1 mo.	Tubercle.	A. C., P. C.	Bramwell: <i>Edin. Jour.</i> , xxiv, 145.
11	M.	56	" l. "	4 yrs.	Cyst softening.	Inf. Par. Lob. P. C.; m. 1-3.	Carter: <i>Med. Times and Gaz.</i> , li. 399, 1886.
12	F.	60	" r. "	14 yrs.	Old clot.	3 F.; A. C., l. 1-3; Is. Reil.	Wood: <i>Phil. Times</i> , v, 470.
13	M.	34	" r. "	3 mos.	Abscess.	Inf. Par. Lob. P. C.; m. 1-3.	Cock: <i>Amer. Jour.</i> , Oct., 1852.
14	M.	19	" l. "	14 mos.	Softening.	A. C.; m. 1-3.	Noyes: <i>Arch. Med.</i> , July, 1882.
15	M.	50	" " "	4 mos.	Sarcoma.	A. C., P. C.; m. u. 1-3.	Feabody: <i>Arch. Med.</i> , April, '82.
16	F.	27	Paræsthesia of l. arm and leg.	2 days.	Softening from thrombosis.	A. C., P. C.; m. u. 1-3.	Sumstead: <i>Arch. Med.</i> , Oct., '79.
17	M.	53	" " "	7 mos.	Tubercle.	Syl. Reg. Isl. Reil.	Seaman: <i>Phil. News</i> , Jan., 1883.
18	M.	54	Anæsthesia of r. arm and leg.	6 mos.	Abscess.	A. C., P. C.; m. u. 1-3.	Page: <i>Med. & Surg. Rep.</i> , xxi, 29.
19	M.	35	Paræsthesia of l. arm and leg.	2 yrs.	Gumma.	A. C., P. C.; m. u. 1-3.	Morton: <i>Chic. Jour. & Exam.</i> , xlvii, 21.
20	F.	38	Hyperæsthesia of l. "	Not stated.	Gumma.	A. C., P. C.; u. 1-3.	Mills: <i>Arch. Med.</i> , Aug., 1882.
21	M.	57	Hyperæsthesia and anæsthesia of l. arm and leg.	"Some months."	Tubercle.	Sup. Par. Lob.	Petrina, l. c.
22	F.	24	Anæsthesia r. arm and leg.	2 days.	Tub. meningitis.	A. C., P. C.; Par. Lob.	Cerf: <i>Arch. klin. Med.</i> , xxxi, 431.
23	F.	24	" r. "	23 days.	Abscess.	Sup. Par. Lob.	Smith: <i>Lonc. Med. & Nat.</i> , Dis. July, 1882.
24	M.	66	" r. "	18 mos.	Softening.	A. C., P. C.; m. l. 1-3 Inf. Par. Lob.	Mills: <i>Phil. Times</i> , ix, 246.
25	M.	—	" r. "	28 days.	Abscess.	P. C., mid 1-2 Inf. Par. Lob.	Liddell: <i>Amer. Jour. Med. Sc.</i> , July, 1883.
26	F.	36	" " " arm and leg.	2 mos.	Softening.	P. C. and Int. Par. Lob.	Carson: <i>Practitioner</i> , xv, 217.
27	F.	30	" l. "	10 mos.	Garcinoma.	P. C., m. 1-3; Inf. Par. Lob.	Mills: <i>Arch. Med.</i> , Aug., 1881.
28	F.	53	" l. "	7 mos.	Glioma.	A. C., P. C.; mid. 1-3.	Wood: <i>Amer. Jour. Med. Sc.</i> , April, 1884.
29	M.	—	L. hemianæsthesia.	1 yr.	Sarcoma.	A. C., P. C.; u. 1-3 sup. Par. Lob.	Seguin: <i>Trans. Neuro. Soc.</i> , 1877.
30	F.	27	" "	2 mos.	Sarcoma.	A. C., P. C.; m. u. 1-3.	Reil: <i>Amer. Jour.</i> , July, 1870.
31	M.	30	" "	6 mos.	Tumor.	A. C., P. C.; m. u. 1-3.	Jaueway: <i>Med. Record</i> , ix, 651.
32	M.	33	" "	14 mos.	Abscess.	P. C., Inf. Par. Lob.	<i>Hospital Gazette</i> , vi, 559.
33	M.	50	" "	3 mos.	Softening from thrombosis.	A. C., l. 1-3; Is. Reil.	Petrina, l. c.
34	M.	67	" "	22 days.	Softening.	A. C., P. C. l. 1-3; Is. Reil.	Tripler: <i>Ken. Mens.</i> , 1880, p. 138.
35	F.	57	" "	1 mo.	Softening from emb.	A. C., mid. 1-3.	Dejerine: <i>Prog. Méd.</i> , viii, 781.
36	F.	23	R. hyperalgnesia.	3 days.	Glioma.	A. C., P. C., m. l. 1-3; Inf. Par. Lob.	Cheesman: <i>Arch. Med.</i> , Aug., '81.
37	F.	42	R. hemianæsthesia.	4 mos.	Softening.	A. C., P. C. l. 1-3; Par. Lob.	Mills: <i>Med. Bulletin</i> , i, 13.
38	F.	66	" "	2 yrs.	Clot.	Is. Reil.; Inf. Par. Lob.	Richardson: <i>Richmond Med. Jour.</i> , iii, 426.
39	F.	51	" "	20 yrs.	Hemorrhagic cyst.	A. C., P. C.; Is. Reil.	Starr: <i>Amer. Jour.</i> , July, 1884.
40	M.	72	" "	Not stated.	Clot.	Inf. Par. Lob.	Tripler, l. c.
41	M.	42	" "	Not stated.	Clot.	Inf. Par. Lob.	Tripler, l. c.

¹ These cases were cited in full in the original essay. They are here tabulated to save space.

ABBREVIATIONS.—A. C., P. C.—Ant. and Post-Central Convolutions; l., m., u.—lower, middle, upper thirds of these convolutions; Sup. Par. Lob., Inf. Par. Lob.—Superior and Inferior Parietal Lobules; Is. R.—Island of Reil. 3 F.—third Frontal Convolution.

lesion (embolism, thrombosis, hemorrhage), or to pressure upon the cortex by a tumor or clot. It was in these cases that the lesion, after for a time irritating the cortex, produced its disintegration, and the symptoms of irritation were followed by those of destruction.

2. Symptoms of destruction of the cortex.

These occurred in thirty-two cases. In all of these cases the loss of sensation was permanent, but in none of them was it complete. This fact adds probability to the hypothesis already advanced, that *each* side of the body is connected by sensory tracts with *both* sides of the brain, destruction of the sensory area of one half of the brain producing great impairment, but no absolute loss of sensation, in the opposite side of the body. This hypothesis also offers an explanation for some of the numerous cases which are on record, in which a careless examination of the condition of sensation failed to detect any anæsthesia, but in which a disease of the sensory-motor area of the brain was discovered after death. There are many such cases to be found in medical literature, and Ferrier has cited them in opposition to the views of Exner, who, as already stated, was the first to connect sensory symptoms with lesions of the motor area. Such cases are, however, of little value, since in many of them no mention is made of the condition of sensation, and in many the tests applied to detect the various kinds of disturbance of sensation were not accurately applied. Like the cases cited by Brown-Séquard in opposition to all the facts of localization, these cases do not bear a strict examination.

The forty-one cases here collected, together with the twenty-two cases collected by Exner, afford sufficient ground for the conclusion that lesions affecting the cortex of the brain in the central and parietal convolutions, may give rise to sensory symptoms.

It is well known that definite regions of the central convolutions of each hemisphere govern definite portions of the muscular system. The motor area for the opposite half of the face and tongue lies in the lower third of the central convolutions. The motor area for the opposite arm lies in the middle third of the central convolutions. The motor area for the opposite leg lies in the upper third of the central convolutions, including the paracentral lobule.¹

It is interesting to find that a similar distribution of the sensory areas may be affirmed. In the cases here collected, the lesion lay in the lower third of the sensory motor area when the face was affected by sensory disturbances; the lesion lay in the middle third of this area when the arm was affected; the lesion lay in the upper third of this area when the leg was affected. When sensory symptoms occurred in both face and arm, the lower and middle areas, or their junction, were found diseased. When sensory symptoms occurred in both arm and leg, the middle and upper areas, or their junction, were found diseased. And it is a noticeable fact that in no case were face and leg affected together without implication of the arm, a fact which affords a clear indication that their areas are separated by that of the arm.

It is therefore justifiable to conclude that :

1. In the cortex of the brain sensations of touch, pain, temperature, and the muscular sense are perceived.
2. These perceptions occur in the gray matter of the anterior and posterior central convolutions and of the parietal convolutions; sensations from one side of the body being perceived in the opposite half of the brain in a more intense degree than in the same half of the brain.

¹See Charcot: "Localization des Maladies Cérébrales," Paris, 1876; and collections of cases in the *Rev. de Méd.*, 1877, 1879, and 1883.

Nothnagel, "Topische diagnostic der Gehirnkrankeiten," 1879.

Exner, "Untersuchungen ub. d. Local. d. Functionen in d. Grosshirnrinde," 1880.

Wernicke, *l. c.* Ferrier, "Localization of Functions in the Brain," 1878.

Starr, *Amer. Jour. Med. Sci.*, April and July, 1884.

3. The various sensory areas for various parts of the body lie about and coincide to some extent with the various motor areas for similar parts—the area for the face, arm, and leg, lying in the lower, middle, and upper thirds of the sensory-motor region respectively.

4. While the motor area is confined to the central convolutions, the sensory area includes to some extent the convolutions of the parietal lobe which lie adjacent and posterior to them. It is therefore more extensive than the motor area.

These conclusions are further strengthened by a review of the cases of lesion of other areas of the cortex. Such cases cannot be cited here.¹ It may, however, be affirmed that in cases of disease limited to the frontal, temporal, sphenoidal, or occipital regions of the brain disturbance of sensation is not observed.²

GENERAL CONCLUSIONS.

A study of the anatomy of the central nervous system by the various methods at present used, an examination of embryological facts both in normal infants and in cases of abnormal development, a review of the results of physiological experiment and a collection of pathological cases of small lesion limited to definite tracts and to definite areas of the cortex of the brain, have led to the following conclusions:

A.—The surface of the body is connected with a definite region of the surface of the brain by distinct tracts which convey sensory impressions. These impressions enter the spinal cord by the posterior nerve-roots, and then ascend in different tracts.

(a) The impressions destined to awaken the sensation of

¹ See authorities cited in last note.

² This is also the result reached from a study of the American cases which I have collected and published in the *Amer. Jour. of Med. Sci.*, April and July, 1884.

touch pass at once to the opposite half of the spinal cord, to a great extent if not entirely, and ascend in the posterior white columns, the impressions from the legs passing in the posterior median, and those from the arms in the posterior lateral columns. On reaching the medulla these impressions pass to the *formatio reticularis* of the same side on which they were in the cord, and ascending in this tract through the pons and crus, reach the internal capsule, where they are conducted by a tract lying in the inner half of its posterior third to the *corona radiata*, whence they diverge to the cortex of the central and parietal regions, the impressions from the leg being perceived in the upper third of these regions, and those from the arm being perceived in the middle third of these regions.

(*b*) The impressions destined to awaken the sensations of pain and temperature also cross the median line immediately after entering the spinal cord, and pass up in the gray matter of the cord, probably in its posterior inner part. On reaching the medulla they enter the *formatio reticularis*, and from this point their course is identical with that of the impressions of touch already traced.

(*c*) The impressions destined to awaken the sensation of the location and of the motion of a limb ascend in the spinal cord, in the posterior white columns of the same side upon which they enter; the muscular sense from the legs passing up in the posterior median, and that from the arms in the posterior lateral columns. On reaching the medulla, these impressions pass to the opposite side through the sensory decussation, then ascend in the *interolivary tract*, to the pons, where they enter the *lemniscus*, and gradually turn outward from the median line as they pass up through the pons. In the crus, these impressions are conducted by the lateral *lemniscus*, which lies in the outer third of the *tegmen-*
mentum, and which passes directly into the internal capsule,

there being situated in the middle part of the posterior third, external and in close approximation to the sensory tract of touch already described. From this point, the course of these kinds of impressions cannot be distinguished from one another, and their termination is in the cortex of the central and parietal regions, the muscular sense of the leg being perceived in the upper third, and that of the arm in the middle third, of these regions.

B.—Sensory impressions from the face enter the pons by the sensory root of the trigeminus, and pass downward to sensory cells which lie in the lateral portion of the *formatio reticularis*, and which are arranged in a column extending from the junction of the upper and middle third of the pons, to the lower limit of the medulla. The upper portion of this column receives the fibres from the upper branch of the nerve; the middle portion from the middle branch, and the lower portion from the lower branch. The course of sensory impulses, from these sensory cells to the brain, is in the lateral part of the *formatio reticularis* of the same side upon which they enter, up to the junction of the upper and middle thirds of the pons, where they cross the median line and join the sensory impressions from the body in the *formatio reticularis*. In the *crus cerebri*, these impressions pass in the outer half of the *tegmentum*, and, thence entering the posterior third of the internal capsule, pass on to the *corona radiata*. In the divergence of fibres in the *corona*, these impressions pass along the lowest radiation, and thus reach the lower third of the central and parietal regions, where they are perceived. It is, as yet, impossible to distinguish between the course of tactile, painful, and muscular impressions from the face to the cortex of the brain.

C.—Sensory impressions from the great cavities of the body enter the spinal cord by the posterior nerve-roots, and are probably received by sensory cells which lie in the inner

and posterior part of the gray matter of the spinal cord—the Clarke column of cells. From these cells, these impressions pass outward to a white column lying in the lateral periphery of the cord—the direct cerebellar column—in which they pass upward to the medulla, and on through the restiform body to the cerebellum, to terminate either in the nucleus dentatus or in the cortex, or in both. The existence of a decussation of these impulses is undetermined, but, if it occurs, it must take place soon after their entrance, as each direct cerebellar column passes to that hemisphere of the cerebellum of the same side upon which it lies. The impressions thus transmitted to the cerebellum are not those of touch, pain, temperature, or the muscular sense, and are probably impressions connected with the functions of vegetative life and destined to awaken reflex actions.

If the facts here presented prove of value in aiding the diagnosis of local foci of disease in the central nervous system, the object of the author will be attained.

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THE ANATOMICAL AND PHYSIOLOGICAL BASIS OF THE KINESIO-NEUROSES OF INFANCY AND CHILDHOOD.*

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THE knowledge of the important subject of the anatomy and physiology of early life is fragmentary and meagre in comparison to the great mass of facts which have been accumulated with reference to the adult organism. This department of medical science is a kind of "accessory system" which has followed the order of historical development. It was a matter of little moment to the ancients whether infants survived or perished. With modern civilization the value of all human life has increased—that of the child in geometrical ratio to that of the adult.

When some quaint old volume of a hundred years ago comes to hand, one realizes how much the spirit of investigation and scientific inquiry has done for medicine in the century that has passed, and how much more it will probably do in the century that is to come. Such a work is that of Rosen von Rosenstein, who was "first physician to his Swedish Majesty, and Knight of the Polar Star." He wrote so well that Dr. Andrew Sparrman translated his book, which was entitled "The Diseases of Children and their Remedies," and published it in 1776. The following is the

* Read before the Alumnae Association of the Woman's Medical College of the N. Y. Infirmary, June 27, 1884.

paragraph introducing the short chapter on "Convulsions and their Ten Causes," the only chapter on nervous affections of childhood in the book :

"The nerves of children are very sensible and irritable. They are more numerous in proportion to their bodies than those of a grown person ; and as they have many juices or fluids, they are so much the more softened. They are also covered with a very thin membrane, which makes their sensations so much the greater. For this reason children are subject to startings, and these, at whatsoever time of life they occur, are called convulsions ; but when the whole body is affected, and the face at the same time appears bluish, it is then called an epilepsy."

To the writers of Gerhardt's "*Handbuch der Kinderkrankheiten*" one is indebted for any thing like a comprehensive view of the subject. Each contributor in his turn exclaims at the lack of research in this direction. Prof. W. Henke in his article for that publication on the *Anatomie des Kindesalters*¹ begins with saying :

"The anatomy of childhood, or the unfolding of our organism from the state in which it was born till its full development, is strikingly little known."

Vierordt,² who gives the most elaborate description of the physiology of childhood to be found, makes the following statement :

"A physiology embracing the whole period of childhood has hitherto not been attempted. The writing of Emil Allix, '*Etude sur la physiologie de la premier enfance*,' published in Paris, in 1867, is limited to the two first years of life." Vierordt also depicts the pressing necessity of the investigation of the physiology of this period of existence in order to solve problems, pathological and otherwise, which have so long remained without an answer.

¹ Gerhardt's "*Handbuch d. Kinderkrhntn.*," ed. 1882, vol. i.

² Gerhardt's "*Handbuch Phys. des Kindesalters*."

To Soltmann, the investigator will feel especially grateful, since by experiment and pathological study he has thrown light on some of the most obscure points in connection with the subject.

Take away what has been done by these three writers, Henke, Vierordt, and Soltmann, which is comparatively recent, and there would be very little left. As has been already intimated there is no one book which deals exclusively with the anatomy and physiology of childhood. The standard works in English, French, and German on children's diseases, recognize for the most part the necessity of such a knowledge to a correct interpretation and satisfactory treatment of the diseases of early life; but have been compelled by their own limitations to dismiss it with simply alluding to certain facts in a sketchy and cursory manner.

If what has been said is true in regard to the physiology and anatomy of childhood in general, it is doubly applicable to that of the nervous system.

These prefatory statements have been made not only to display the true state of the subject, but as a *raison d'être* for this article, which has for its aim to present such facts as can be gathered together to show that the nervous diseases peculiar to early life have an anatomical, physiological, and psychical basis, which explains why the kinesi-neuroses tetanus, convulsions, chorea, and epilepsia are most prevalent in early life.¹

That the nervous diseases of childhood are motor is patent to the most superficial observer; but how almost exclusively motor is not perhaps realized until the statistics relating to them are reviewed. Neuroses of the sensibility are exceedingly rare before the tenth year. Valleix knew of but one example: a case of lumbago, which oc-

¹ Soltmann: "Die Functionelle Nervenkrankhtn.;" Gerhardt's "Handbuch d. Kinderkrankht.," p. 4, B. 17.

curred in a child a year old. Neuralgia is a rare affection of childhood, and of adolescence as well. In 296 cases reported, only two occurred before ten years of age, and twenty-four before the twentieth year. Enlenburg,¹ in 101 cases had only six which occurred from the seventh to the nineteenth year, not one before seven. Soltmann,² in his observation of nearly ten thousand children, found only twenty-two with cutaneous neuralgia.

Convulsions are the most prevalent of nervous diseases of the infant. West³ makes the statement that seventy-four per cent. of all deaths which take place during the first year of existence are from diseases of the nervous system. In the next two years they are one third as frequent, from ten to fifteen they come less than three per cent., and over fifteen one per cent. The Registrar-General's report, London, 1849, records the death by convulsions of 1,135 males, 1,123 of whom were under five years of age; and of 928 females, 890 were under five years.

The next great motor neurosis of children is epilepsy. By far the greater number of attacks of this disease occurs before puberty. According to Beau, among 210 there were 191. Hasse, among 995 reports 757 as recurring before the twentieth year; Bouchut and Cazanvieuhi, among 66 give 40 as occurring during that period. The proportion to the various ages can be seen at glancing at the subjoined tables.

Bouchut and Cazanvieuhi, 66 Cases.		Beau, 210 Cases.	
Age at time of Outbreak.	No. of Cases.	Age.	No. of Cases.
0—5 yrs.	18	6—0 yrs.	39
10—15 "	22	6—12 "	43
15—20 "	10	12—16 "	49
20—25 "	5	16—20 "	17
25—30 "	4	20—30 "	29
30—35 "	1	30—40 "	12
40—60 "	4	40—61 "	21

¹ "Handboch d. Nervenkhntn."

² *Loc. cit.*, p. 296.

³ West: "Diseases of Children."

Hasse, 995 Cases.

Age.	No. of Cases.	Quoted from Gerhardt's "Kinderkrhntn." Soltmann: "Die funktionellen Nervenkrhntn."
—1 yr.	87	
2—10 yrs.	306	
10—20 "	364	
20—30 "	111	
30—40 "	59	
40—50 "	51	
50—60 "	13	
60—70 "	4	

The third great motor disease of childhood is chorea, which occurs chiefly from the seventh to the fourteenth year. Its distribution through the years of childhood is shown in the following tables, as well as the sex distribution:

Rufz, 189 Cases.

Age.	Boys.	Girls.	Total.
1—4	3	2	5
4—6	2	3	5
6—10	16	45	61
10—15	30	88	118
Total . . .	51	138	189

Hughes, 100 Cases.

Age.	Boys.	Girls.	Total.
1—10	11	22	33
10—15	11	34	45
15— ?	5	17	22
Total . . .	27	73	100

Lewis Smith, 1471 Cases.

Sée, 191 Cases.

Years.	No.	Years.	No.
1—6	121	1—6	11
6—10	855	6—10	94
over 10	238	11—15	57
466 Boys.		15—21	15
1,005 Girls.		21— ?	12

What then are the underlying anatomical and physiological conditions of infancy and childhood which cause this peculiar irritability of the nervous system which displays itself preëminently in motor phenomena. It may be replied that these are:

I.—Growth.

II.—The comparatively large development of the nervous system and its intimate relation to the rest of the body.

III.—The predominance of reflex action over voluntary.

IV.—Unstable condition of nerve elements.

V.—Peculiarities of the circulatory system.'

FIRST CONDITION:—*Growth.*

In the earliest condition of the embryo, as in the protozoa, there is growth without the presence of a distinct nervous system; "nervous and non-nervous elements are chaotically mixed." Embryologists have been indefatigable in their researches, and thanks to their investigations, the panorama of the development of the nervous system to the time of birth is more or less clearly unfolded. They have shown how the primitive streak gives place to the medullary groove, with its increasing layers of epithelial cells; how the medullary groove becomes a simple epithelial tube, from whose walls are to be developed the nerve centres, including the complex cerebrum, with its basal ganglia, nerve nuclei, and intricate tracts of connecting nerve-fibres; how the tube bends, the cephalic portion expands into the cerebral vesicles; how the cerebro-spinal ganglia are pushed out from the central nervous system, as are also those of the sympathetic; how delicate nerve fibres are developed which are to unite the medullary tube with the surrounding parts and to connect the dorsal portion of the nervous axis with the sensory organs, which are developed from the epiblast—the ventral with the motor organs, the muscles, which are developed from the mesoblast; how in the fourth to the sixth week the anterior and posterior horns appear; how, at the third month, and becoming substantially complete at the fifth month, the principal groups of motor cells of the anterior horns have become differen-

tiated from the surrounding embryonic tissue. These groups, which, according to Ross, are the first to attain the dignity of processes, preside over fundamental actions which are carried on in a reflex manner, and are in a great measure independent of the cerebral ganglia, while the median cells belong to the so-called accessory system since they preside over special and skilled movements, and at the birth of the child are less developed and less formed than afterward.

Aristotle divided life into three epochs: 1. Growth, including infancy and childhood; 2. Maturity; 3. Decline. Growth is the crowning distinction of the anatomical, physiological, and psychical conditions of early existence in contrast to those of the adult. The consideration of the anatomy and physiology of this Aristotelian epoch would, with its almost daily changes, require a daily record from the moment of birth to puberty. The new-born infant passes through, in the first five or six months, a well-marked period, "the first epoch of transition," after which comes the perilous time of first dentition, extending through the second year. These two constitute the period of "infancy." The four or five years succeeding are called "the epoch of transition," which in turn is followed by the period of second dentition, including the years from eight to fourteen. During all this time, now slowly, now more rapidly, the mysterious process of growth is silently, yet ceaselessly, going on, transforming as by a miracle the puling, helpless infant into the round and rosy child, and the round and rosy child into the vigorous and comely youth of goodly proportions. It adds weight to the body, increasing it in length, breadth, and thickness. Each organ of the body participates in the growth. The microscopical elements are both enlarged individually and multiplied in number. For instance, the muscle, according to Budge, becomes thicker through the broadening, as well as through the addition to the number of muscular fibres.

Nowhere is the process of growth more rapid than in the nervous system. The growth of the brain is unparalleled anywhere else in the body. It has been likened to that of the pregnant uterus. The weight of the cerebrum is doubled in the first two years, and it reaches nearly its maximum¹ at the end of seven years, after which its growth is slow. With this rapidity of growth development of function is going on. Thus the triple process of growth, nutrition, and function takes place at the same time, in the centres which preside over the nervous system—conditions which prevail in other parts of the body as well. It would take a long chapter to set forth all the variations and fluctuations of growth, and to show the ingenious tabulations² to display its relation to cell and fibre, to tissues and combinations of tissues into organs; but certainly it cannot be doubted that it stands intimately related to the peculiar pathological manifestations and the singular irritability of the nervous system of the infant and child.

SECOND CONDITION:—*The comparatively large development of the nervous system and its intimate relation to the rest of the body.*

According to the tables of Vierordt, the relative weight of the nerve-centres is far greater than in the adult. The brain is 14.34 % of the body-weight, while that of a full-grown person is 2.37 %. "The vital unit" is more strongly characterized, and the functions have a greater reciprocal dependence; consequently any disturbance in any part of the system destroys the nervous equilibrium. Says Ross: "The nervous system is a mechanism by which

¹ Sigmund Fuch's (Litzungs ver der Akad d. Wissensch. in Wien, 1883) states that the brain of a new-born child possesses no tracts of medullated fibres neither in the central nor cortical portions. During the seventh and eighth year the medullated fibres reach the disposition which they preserve throughout adult life. He says we may assume that these chronological differences in the development of the medullated fibres correspond to their physiological interpretation.

² These have been gathered together by Vierordt in his "Physiologie des Kindesalters," *loc. cit.*

all the actions of the individual are brought into relation with one another and with the action of external agents upon the organism. Disease of the nervous system is indicated objectively by a loss of harmony between the various actions of the individual; hence arises a disturbance of the motor function or the kinesio-neuroses. How easily this loss of harmony is brought about in early life is illustrated by the slight causes which produce convulsions—undigested food in the stomach, irritation of the intestinal tract, the process of cutting a tooth. Each, as is well known, may bring on a paroxysm.”

Table¹ showing the changes which occur in the organism from birth to adult life, in the weight of the various organs in the percentage of body-weight:

						New- Born.	Full Grown.
Skeleton	.	.	.	.	.	16.07	15.35
Muscles	.	.	.	.	.	23.04	43.09
Skin	.	.	.	.	.	11.03	6.03
Brain	.	.	.	.	.	14.34	2.37
Spinal Cord	.	.	.	.	.	0.20	0.67
Eyes	.	.	.	.	.	0.28	0.023
Lungs	.	.	.	.	.	2.16	2.01
Heart.	.	.	.	.	.	.89	.52
Thymus	.	.	.	.	.	.54	0.0036
Stomach and intestines	.	.	.	.	.	2.53	2.34
Pancreas	.	.	.	.	.	0.12	0.15
Liver	.	.	.	.	.	4.39	2.77
Spleen	.	.	.	.	.	0.41	0.346
Supra-renal capsules	.	.	.	.	.	0.31	0.014
Kidney	.	.	.	.	.	0.88	0.48

THIRD CONDITION:—*The predominance of reflex action over the voluntary.*

The infant and young child may be compared to Goltz's frog, which, when its cerebrum was removed, executed coördinate movements if external stimulus was applied. If thrown into water he would swim, if stroked he would croak rhythmically. In much the same way the infant draws its first breath when its sensitive skin comes in contact with the air; so it smiles or weeps when played upon by pleasurable or disagreeable sensations. The

¹ “Grundriss der Physiologie,” fifth ed., p. 605.

brainless frog and the infant are machines: the first nothing more; the second a machine, now imperfectly, but as time goes on and the higher centres with their connecting nerve-paths are developed, to be more or less completely governed and checked by the will. Meynert has shown that motions are produced in two distinct ways, according as the impressions travel through two distinct paths: the reflex path, which is complete at birth; and the paths from cortex to periphery, which are not then developed,

Soltmann's experiments on new-born puppies beautifully demonstrate the gradual development of the voluntary paths. He found that it was not until the tenth day after birth that the fore paws moved in response to electric irritation of Hitzig's cerebral areas. On the sixteenth day two other centres were discovered, one for the hind paw and one presiding over the facial muscles. He has also demonstrated that the inhibitory centres (Setzchenow's) do not exist in the new-born. He reasons, therefore, that an irritation of the gray substance meets no resistance, there is no obstacle to be overcome, hence an impulse travels unhindered through the motor channels.

Obscure and difficult experiments however interesting and instructive are not necessary to demonstrate that it is very gradually that the will obtains its control. The fond and delighted mother sees the unskilled and purposeless movements of her babe give place to those of ease and grace. Little has she realized the structural preparation which has been going on; how round cells without membrane have given place to caudate cells with a membrane; how the caudate cells, with their few processes, develop as their relation becomes more complex, a greater number of processes keeping pace with the functions, as they advance from actions diffused and simple to those which are well defined.

¹Soltmann: *Exper. Studien über die Funktionen des Grosshirnes der Neugeborenen. Jahrb. f. Kinderheilkde*, 1875, IX., 106.

The physical basis of the mind offers a vast theme for speculation and scientific adventure. We build our theories of the how and the wherefore to-day, and see stretching before the future anatomists and physiologists of both the unfolding and developed organism, an immense labyrinth of knowledge into which he will be led by the slender threads of hypothesis and theories of the present.

It is readily seen that the influence of the will upon the nervous system is exceedingly small in early infancy ; and only gradually developed during the period of childhood, at no time attaining such control as in the adult ; but the lower centres are well-nigh perfectly developed, so that reflex action unchecked by the cerebrum forms the crowning characteristic of nerve force. As it has been expressed : there results a radiation of impulses since the will is less centralized and isolated into neighboring paths resulting in a more or less involvement of voluntary muscles.

FOURTH CONDITION :—*Unstable Condition of Nerve Elements.*

The nerve elements consists of ganglion cells and conducting fibres. The physiologist says that a nerve impulse gives rise to no visible alteration of form, but transmits along with itself certain molecular changes set up by the stimulus. The most advanced theorizers in regard to nervous functions think that there can be little doubt that nerve irritability depends upon the fact, that the protoplasm of the axis-cylinder is composed of molecules in unstable position, and that these are so connected that the movement or alteration of one leads to the movement or alteration of those in the immediate neighborhood. In other words all nervous phenomena depend on molecular oscillations and chemical changes.

The physical and chemical peculiarities of the tissues of early life are comparatively little known.¹ It is well

¹Vierordt : " Physiologie des Kindesalters," *loc. cit.*, p. 389.

recognized that they contain much more water,¹ which increases the weight of the organs and tissues, notably the muscles, liver, and brain ; it also increases their delicacy, and so the partitions separating structure from structure are much thinner, consequently the endosmotic interchange takes place much more readily than in the adult. Metabolic processes are much more extensive and more rapid than in the full-grown.

As a physiological result the nervous system is much more responsive to stimuli. The molecules, according to one of the axioms of the molecular theory, require less force to move them, the greater the departure from the solid form. The same rule applies to chemical action. *Corpora non agunt nisi sint soluta* was the maxim of the ancient chemists. Therefore this watery, pulpy condition of the tissues must be an important factor in the neuroses of childhood, facilitating as it does the molecular and chemical changes incident upon the generation of nervous impulses.

FIFTH CONDITION :—*The Circulatory System and its Peculiarities.*

The amount of blood on account of the great activity of the organs is much greater in proportion in the infant and child than in the adult. It circulates with greater rapidity, coursing through the whole body in 12.1 seconds in the new-born, 18.6 in the youth of fourteen, and 22.1 in the adult.² The large amount and rapidity of the circulation predisposes to inflammation and congestion of all the organs, which may react indirectly on the nervous system, because of the close relationship of the various parts of the organism of the child already alluded to ; or it may act directly, causing inflammation of the brain itself or of its meninges.

¹ Molleschott estimates that 68 % of full-grown human body is water ; Fehling gives that of the new-born as 74. 4 %.

² Vierordt : *loc. cit.*, p. 314.

The skull with its distensible fontanelles and unossified sutures taken together with the softness of the brain-substance permits extensive variations of cerebral circulation in the infant. The quantity of blood can be greatly increased or correspondingly diminished. Another mechanism which checks the too violent entry of the blood into the brain of the adult is not perfected in the child if the statement of Moxan in one of the Croonian lectures¹ is to be relied upon. He says :

“ When the heart acts violently (that is, in the adult) the choroid plexus becomes distended and the finger-like cornu of the fourth ventricle, which contains the blood-vessels of the choroid plexus, becomes distended and presses on the root of the vagus and so moderates the heart’s action. It is a contrivance like the ball-tap of a cistern.” In early life, as has been said, the connection of these parts is not made.

Soltmann’s experiments on new-born animals prove that a more powerful irritation of the vagus is necessary before the changes are as great as in the adult.

Experience shows that the heart’s action is rapid and irregular, and theory and experiment coincide in attributing its rapidity to the imperfect development of the inhibitory apparatus. The vaso-motor centres are very responsive, as illustrated by the quick blushes of the child when under the influence of mental emotion. But vaso-motor variations, and other peculiarities of the blood, such as its morphological structure² and chemical composition³; the influence

¹ Influence of circulation on Nervous System. Croonian Lectures for 1881. *Jour. of Ment. Sc.*, Oct., 1881.

² Moleschott has found that the proportion of red blood corpuscles is relatively greater in the child.

Arnheim (*Jahresbuch f. Kdhlk.* 1879, xiii. 293) found an average of $4\frac{1}{2}$ million corpuscles to the c. m., half a million less than the adult.

³ Hæmoglobin is very abundant in the first weeks of life, then decreases till the sixth year, again to increase and reach a maximum at fourteen. Leichenstern: “*Untersuch. ueber den Hæmoglobulin gehalt des Blutes.*” Leipzig, 1878. Quoted by Vierordt.

of blood pressure, are obscure points which need further elucidation, but doubtless have effects which, if they were known, would go a great way toward explaining the problems of the neuroses. The plethoric and anæmic theories of epilepsy advanced by Henle, Schroeder van der Kolk, Echeverria, and Meyer, are well known; combined excitation of the vaso-motor and convulsive centres, according to Nothnagel, is the necessary pathological condition; while Kussmaul and Tenner have shown that epileptic convulsions are produced by rapidly depriving the brain of blood. Kirk has pointed out the part that embolism plays in chorea, and Hughlings-Jackson advances the same views.

"We see, in chorea," says Dr. Dickinson, "a widely distributed hyperæmia of the nervous centres not due to any mechanical mischance, but produced mainly by causes of two kinds: one a morbid, probably a humoral, influence which may affect the nervous centres as it affects other organs and tissues; the other, irritation in some mode, usually mental, but sometimes what is called reflex, which especially belongs to and disturbs the nervous system, and affects persons differently according to the inherent mobility of their nature."

However, it is not the purpose of this paper to enter into the discussion of the multitudinous theories which have been brought forward to explain the kinesio-neuroses; but these have been cited to show that the extensiveness of the influence of the blood and circulation upon the irritability of the nervous system is appreciated by those who have occupied themselves with the subject.

Given, then, a nervous system rendered peculiarly liable to disease by reason of rapid growth; greater development in comparison to other tissues of the body; less under the guidance and inhibition of the highest nerve-centres, and peculiarly liable to reflex action; its nerve elements un-

stable; a circulation rapid and less under control, it is not surprising that among the diseases of childhood those of the nervous system take a foremost rank. For the reason just stated, all those causes which are instrumental in producing nervous affections in general act more readily upon the susceptible nerve elements of early life, such as the influence of heredity, shocks to the nervous system, fright and terror, the peculiar effects of example, which have caused epidemics of chorea as well as hysteria; derangements, local and constitutional, which result in convulsions in a child, and in a rigor or delirium in the adult.

The reasons why the neuroses of infancy and childhood should be motor rather than sensory have already been indicated. They may be summed up as follows:

1. The reflex arcs, of which the motor strands form an important part, are earliest perfected, so that when a sensory stimulus sets free nerve energy, it is liable to overflow into motor paths.

2. Intellectual comprehension of sensation, and, consequently, of pain, is the last to be developed; in consequence, severe nervous shocks, which would give rise to exquisite pain in the adult, result in a kinesio-neurosis in a child.

It must not be lost sight of that the periods of infancy and childhood embrace a wide range of conditions. The four epochs of first and second transition and of first and second dentition vary from each other in many striking respects. A state of continued progression and development is going on,—a continued series of changes of anatomical, physiological, and psychical events, with which the manifestations of disease keep pace, and by which they are modified.

In early infancy it has been shown that the simple kinesio-neuroses prevail,—infantile trismus, inward fits, the rare disease of salaam convulsions, eclampsia. Later the eclampsia of the child gives place to the more complex disease of

epilepsia, epilepsy, the acute disease of eclampsia, which has become chronic. In very young children the curious sensory phenomena which characterize the *aura epileptica* is less marked; that and the cerebral symptoms become more prominent as the years advance. Chorea, which is a psycho-motor neurosis, rarely occurs before the age of six. Hughlings Jackson says: "Since the disorder in chorea is of movements which are acquired and which are probably only fully learned by a long apprenticeship, I used to suppose that the nervous arrangements for these movements were but partially developed in children, and that the motor processes involved and their arterial integration would be, so to speak, caught in the stage of incomplete development,—in short, their centres were diseased when half educated."

As every one knows, the great weight of the disease falls upon the muscles, and the motor manifestations range through all degrees, from the slight twitchings of chorea minor to the general chorea in which the body undergoes every variety of muscular contortion, meriting thereby the descriptive epithet of Bellingham, "insanity of the muscles," or that of Bouillaud, "*folie musculaire*." While the relation between chorea and hysteria is not so clearly manifest as that between eclampsia and epilepsy, yet there are sensory and psychical disturbances occurring in chorea which make it easy to see that the choreic child may become an hysterical young person. Sometimes nervous disease is precocious in the child, and hysteria develops early. Briquet speaks of it appearing under the age of ten in one eighth of his cases; but, as a general thing, hysteria is not seen till the period of growth merges into that of maturity and the pathological development of the neuroses has followed the anatomical and physiological, the result of which is a complex disease of the entire nervous system, affecting motility, sensibility, circulation, nutrition, and the psychical life.

A CONTRIBUTION TO THE STUDY OF HYS- TERIA, BEARING ON THE QUESTION OF OÖPHORECTOMY.*

By G. L. WALTON, M.D.,

BOSTON.

WHILE we have every reason to congratulate ourselves that we have cut loose from the ancient view that all hysteria owed its origin to a disordered uterus, we can not overlook the fact that there exists a certain number of cases (small perhaps in comparison) in which the nervous symptoms are secondary to organic pelvic disease as peritonitis, cellulitis, or cystic degeneration of the ovaries. Certainly when the hysterical symptoms, occurring in persons possessing no hereditary nervous susceptibility, date from the accession of the pelvic trouble, and disappear with its relief, the etiological connection between the local and the general disturbance can hardly be doubted.

It is to this class of cases as distinguished from these in which the local symptoms are secondary to the hysteria, that the question of oöphorectomy should be narrowed. We shall perhaps be obliged to include some cases in which no organic disease is suspected, but in which functional menstrual disorders are at the root of the difficulty. We should hesitate long however, I think, in such a case before advising the operation.

In certain cases of hysterical hemianæsthesia and hys-

* Read before the American Neurological Association, New York, June 20, 1884.

tero-epilepsy it seems extremely probable that the implication of the ovaries in an organic disease offers the starting-point for the irritation producing the hysterical condition, and in such cases the prospect of relief from operation is too good to be neglected when milder measures have failed, and when the symptoms are severe enough to make life a burden, a result to which severe pain of various sorts generally contributes largely in these cases.

As to the anatomical connection between ovaries and hysterical symptoms, there can be little doubt that the cortical cerebral nerve cells are the chief sufferers in hysteria, and all symptoms, mental, motor, and sensory, are most satisfactorily explained by increased and decreased activity of these nerve cells, the final centres of sensation and motion, and presumably the seat of the mental processes. In the majority of cases of hysteria the cerebral difficulty is probably a constitutional one, and the ovarian tenderness which rarely fails is merely a local hyperæsthesia, and in such cases no more can be expected from the removal of the ovaries than from the removal of a sensitive spot on the spine or scalp. In cases of hysteria secondary to pelvic disease, as peritonitis, cellulitis, or cystic degeneration of the ovaries, the local tenderness is of more serious import, and signifies that organic changes have taken place involving the rich nervous supply of the ovarian region, and it is probably by the transmission to the brain through the sympathetic nerves of the irritation thus produced that the hysterical symptoms are brought on. Just what changes occur in the brain in hysteria we do not know, and are not likely to decide for some time, but it will not be inappropriate, as bearing on the connection between hysteria and the ovaries, to present a few arguments here in favor of the vaso-motor theory, by no means as underlying all hysteria or all hysterical symptoms, but as best explaining that set

at least of so-called hysterical cases in which hemianæsthesia is the principal symptom, this being a variety of nervous disturbance probably not rarely to be found in cases of ovarian irritation.

It has been urged that the changes in cerebral activity, giving rise to these and all other hysterical symptoms, are dynamic, and not susceptible of explanation by so simple a physical phenomenon as contraction and relaxation of blood-vessels. To me, however, the explanation implicating the blood-vessels is by far the more satisfactory provided it meet all the requirements, and this it seems to do in at least the class of hysterical patients under consideration.

One of the most striking characteristics for instance of these hysterical symptoms is the suddenness with which they can appear and disappear, a few seconds sufficing in many cases for the complete transfer of anæsthesia from one side of the body to the other. Now while we have no grounds for denying the possibility of dynamic changes occurring with equal rapidity, we are dealing with a tangible phenomenon of which we have frequent illustration, in attributing these changes to sudden alteration in the calibre of the blood-vessels. An instant is sufficient time, and a thought is ample stimulus to cause on the one hand a complete dilatation of blood-vessels over a large area, as instanced in the blush, or on the other hand to reduce the same vessels to their smallest proportions, as in the pallor of fear. That these vaso-motor changes affect the brain as well as the integument is seen by the phenomenon of fainting, in which the higher cerebral functions are completely suspended, presumably from lack of nutritive fluid.

This very illustration is perhaps as good as any of the dependence of the cortical cells on their blood supply, and the variability of the functions of those cells with vaso-motor changes.

In view of these facts the sudden loss of function of the cortical cells of half the brain, as seen in *c. g.*, hemianæsthesia, may easily be imagined to supervene suddenly upon a more or less completed contraction of cortical blood-vessels on that side from irritation of the sympathetic system in some part of the body. Loss of function would in this case persist as long as the contraction of vessel so continued, and at the same time the nerve cells would be ready to take up their duties instantly with the return of blood through cessation of the vascular spasm.

The cortical cerebral cells are richly supplied by a set of blood-vessels freely anastomosing with each other but not with the internal vessels of the brain. It is vaso-motor changes in this set of blood-vessels which best explain the unilateral hysterical symptoms, and in those cases in which these symptoms are secondary to organic disease in the ovarian region we need not draw on our imaginations for the source of sympathetic irritation, for the ovaries are richly supplied with sympathetic nerves which can easily be pressed on by exudation or other morbid material in the diseases under consideration.

This theory by no means limits the cerebral disturbance to one side of the brain, nor on the other hand does it preclude a limitation of the vaso-motor change to a small part of the cortex, as, for example, to that concerned in particular motions or sensations. At the same time it well explains the tendency of the symptoms to spread over an entire half of the brain and hence of the body. To explain the predominance of sensory over motor symptoms, or the opposite, we have only to suppose the vascular spasm more complete over one than over another portion of the cortex.

In cases of hemianæsthesia occurring in persons of neurotic inheritance, without pelvic disease, we can not expect to find a local origin for the sympathetic irritation,

but have only to allow that these patients possess by inheritance a peculiarly irritable vaso-motor system, which furnishes the chief basis for the irregularities to which their cerebral functions are liable, instead of ascribing to the cells themselves the irritability called hysterical.

That neurotic patients of all varieties *are* peculiarly liable to vascular irregularities is evidenced by the frequency among them of chills, flushes, ischæmia, sudden swellings of the joints, and other vaso-motor phenomena. In limiting our suppositions, therefore, to this class of changes, we lean rather to the material side, in that we attribute all the symptoms to an already recognized physical condition.

Again, the regularity with which the hysterical symptoms pass in certain cases from side to side during the "transfer," the oscillations continuing sometimes for hours before equilibrium is established, is strangely suggestive of the ebb and flow of a fluid, and, supposing the vaso-motor irritability about alike on the two sides of the body, could be easily explained by the alternate relaxation and contraction of the vessels of the two sides of the brain. I have myself failed to bring about this phenomenon in a hemianæsthetic in whom I considered the hysteria secondary to abdominal irritation, although I have often verified it upon patients in whom the hysteria was constitutional.

I should hesitate to draw any conclusions from so limited an observation, but propose to investigate the subject further. If, however, experience should confirm this result, I would suggest that the difference in susceptibility to "transfer" is due to the persistence of local pelvic irritation, keeping up in the one case the unilateral vascular spasm, while in the other cases vaso-motor susceptibility is about alike on both sides of the brain. I would also suggest the possibility that in this experiment lies an important diagnostic aid in the separation of these two groups of hysterical patients.

A certain amount of weight is thrown in favor of this vaso-motor theory by a case (I think unique) which I have recently seen through the kindness of Dr. H. W. Bradford, and reported elsewhere in full. The history was, in brief, that of a married lady, aged thirty-two, who had inherited no nervous tendency, but who, since the occurrence of pelvic disease with uterine displacement and offensive purulent discharge per vaginam, had shown slight mental disorder (principally accompanying menstruation) and decided hysterical tendency with motor and sensory disturbance, besides suffering from distressing left-sided migraine of the character commonly designated spastic (hemicrania sympathetico-tonica). Examination revealed a right-sided hemianæsthesia including the special senses. The sight on this side was distinctive of hysteria, with amblyopia, loss of color-sense, and concentric retraction of the visual field. The sight in the *left* eye was *almost wanting*, there being only slight lateral fixation. The fundus of the right eye was normal. In the left eye the only abnormality found to account for the excessive loss of sight was an extreme contractility of the retinal blood-vessels, which under ophthalmoscopic examination contracted to one third their calibre, and the patient was unable to continue the examination. The accuracy of this observation is vouched for by Dr. Bradford, an experienced ophthalmoscopist, who verified it several times, and the most plausible explanation to be offered of this peculiar set of symptoms is that spasm of the blood-vessels on the surface of the left cerebral hemisphere had caused, by implication of the cortical cells, a right-sided hemianæsthesia including the sight, by reaching the meninges a left-sided spastic migraine, and by extension to the fundus of the left eye an intermittent retinal ischæmia. In view of the dating of the symptoms in a previously healthy patient from the ac-

cession of pelvic disturbance, we could not but suspect ovarian origin for the vascular spasm, and in case these symptoms should become severe enough to warrant extreme measures, other treatment failing, Tait's operation would certainly be considered. In point of fact, the only therapeutical pressure suggested, aside from local treatment, was nitro-glycerine in drop doses of the 1 % solution, under which the headaches seemed for a time to lessen, after which the patient relapsed into her previous condition.

Theoretical considerations with regard to the pathology of hysteria are secondary to the main question. Is hysteria ever set up by ovarian irritation, and if so can it ever be relieved by removal of the offending organs? We may, I think, safely answer both parts of this question in the affirmative. Out of the collection made by Battey of oöphorectomy cases between 1872 and 1881, epileptic attacks were present in twenty-six cases, and relieved in two thirds of the number. Since this collection was made a number of cases have been reported in which hysterо-epilepsy, dating from pelvic disease, has been cured by removal of the ovaries, and Carstens,¹ who has reported several such cases, sums up as follows: "In general I might conclude that Battey's operation is not only justifiable, but really we might say it is criminal neglect not to perform it, in cases which fail to be benefited by other treatment. It is a last resort after every other treatment has failed in cases which are caused by ovarian disease, such as hysterо-epilepsy, dysmenorrhoea due to fibroid tumors, and which either endanger the life of the patient or make life a burden to her." It is probable that to this list might be added cases of persistent hysteria in other forms, paralytic as well as epileptic, the condition being established that the cerebral disturbance is secondary to ovarian irritation.

¹ *Amer. Journ. of Obstet.*, March, 1883.

The following case, of which the important particulars have been given in a previous paper, will serve to illustrate the rôle which hysteria may play as an indication for operation.

CASE.—Miss A., a patient of Dr. Barss, of Malden, through whose kindness I was enabled to see her, was first examined by me Jan. 2, 1884 (before operation), with the following result :

The patient, aged twenty-nine, single, belongs to a family free from nervous and mental trouble. She has suffered from excessively painful menstruation, and more or less constant pain in the back, since puberty. Both these symptoms have increased in severity, and of late years various nervous symptoms have been superimposed. The pain in the back is now so severe and constant as to keep her in bed all the time, while the pain of menstruation is so intense during a period of two weeks, that she declares herself ready to undergo any operation rather than endure another sickness. The patient is very feeble, and has lost much flesh. She has been for some years subject to frequently recurring convulsive attacks, in which she is sometimes rigid, and sometimes shakes violently. No distinct opisthotonos has been observed. She has never been subject to attacks of laughing and crying, and no history of characteristic attacks of hysterio-epilepsy can be elicited.

Physical examination.—The patient is somewhat emaciated. The heart and lungs are normal. Palpation and percussion of the abdomen reveal nothing of interest beyond extreme sensitiveness to pressure over the ovarian region on both sides, most marked on the left. The patellar reflex is greatly exaggerated on both sides, most markedly so on the right ; the tap on the tendon producing a violent twitch of the entire body, and causing apparent distress. The pupils are alike, rather large, and react normally to light.

Motion.—There is no paralysis or atrophy of any muscle or group of muscles, but the strength is less on the entire right side than on the left, while deficient on both sides. A tonic contraction exists in the quadriceps femoris on the right, which interferes with attempts to bend the leg upon the thigh. There exists a wax-like rigidity in the right foot, which is very decided. This foot resists forcible movement in any direction, but yields gradually to firm pressure so as to assume any position required ; once placed in a new position, however awkward, as, for example, com-

pletely flexed at the ankle and everted, with the toes extended, the foot remains in precisely that position for some minutes, without causing the least discomfort, or in fact attracting the patient's attention. Left alone for some time, the foot so left gradually returns to an approximately normal position. The left foot shows a tendency to the same condition, though far less marked.

Sensation.—There is loss of all varieties of general sensation (heat, pressure, pain, touch) on the right side of the median line, including the head, trunk, and extremities. Only a comparatively heavy pressure of the finger is felt on this side, while the lightest touch is felt everywhere on the left. Stimuli causing pain on the left, as pinching and pricking, produce not the least sign of discomfort on the right, however suddenly applied.

The *taste*, tested with sugar and quinia, is wanting on the right, and present on the left. The same is true of the sense of *smell*, as tested by lemon and vanilla, this sense being peculiarly acute on the left side, while absolutely failing on the right.

The *hearing* by the bone is impaired on the right, and by the air is less acute than on the left. All tones are heard up to 4224 v. s., the hearing for very high tones unfortunately not being tested.¹ The membranes were not examined.

The *sight* offers the only exception to the anæsthesia, being above normal on both sides without glasses, there being also no retraction of the field of vision, nor trace of color-blindness.

Milder measures, local and general, having failed, it was thought best by Dr. Barss to perform oöphorectomy, an opinion heartily indorsed by myself.

The operation was performed by Dr. Barss, Jan. 24, 1884, and the following is quoted from the account kindly sent me by him: Thorough antiseptic rules were preserved, and the room was specially prepared for the purpose. An incision was made in the median line, both ovaries were ligatured with braided silk and cut off. The Fallopian tubes were not removed. Both ovaries (neither materially enlarged) were full of small cysts. The patient rallied well from the ether, but vomited considerably during the next thirty-six hours, after which she did well, eating and drinking nourishing food. Suppositories were used for some days. Two deep and all the superficial stitches were removed on the fifth day;

¹ Clinical researches made by the writer (since confirmed by other observers) show that the hearing by the bone and that for high tones disappear first in hysterical hemianæsthesia. See *Brain*, Jan., 1883; also "Verhandlung der physiologischen Gesellschaft zu Berlin," Feb., 1883.

the remaining two deep stitches were removed on the eighth day. The patient made a good convalescence, but continued to complain of pain in the lower part of the back. Twenty-four hours after operation a tarry discharge appeared per vaginam, which continued four or five days, since which time there *has not been the slightest sign of menstrual flow* (four and a half months after operation), though at each menstrual epoch she feels a good deal of uneasiness, and slight pain over the ovarian region (facts which lead to the expression of a regret on the part of Dr. Barss that the tubes were not removed as well as the ovaries). For a month or six weeks the patient gained steadily, then ensued a stationary period, ended at the beginning of the fourth month when she took another start for the better, seeming to eat, sleep, and feel generally better, though still complaining of pain in the lower part of the back. Dr. Barss adds: "She has been out to drive, caught cold, and is now suffering from cystitis. While I can not report a well patient, I think I am encouraged enough by the gain she has already made. The operation seems not only justifiable, but particularly so for the nervous trouble, for her greatest gain has been with regard to her nervo-hysterical symptoms. She does not have those jerky, jumping attacks, and I feel sure she has made a marked gain in this respect; if it were not for her backache—which I am in hopes will wear off—she would gain faster. * * * To sum up: here we have a patient whose nervous system is shattered by from twelve to thirteen years of ovarian disease. Operated on for the removal of both ovaries; four months later she has made marked improvement in nervous symptoms, is practically free from pain at the menstrual epoch, and has gained in flesh and appetite. Taking into consideration the length of time she has been suffering, I think we have a right to expect still greater improvement in one or two years."

The following facts with regard to the special hysterical symptoms are taken from my own notes made two months after the operation:

The hemianæsthesia is much lessened, the lightest touch being felt over the entire right side, though not quite so plainly as on the left. The substances which were not perceived at all by smell (lemon, vanilla) and taste (sugar, quinia) on the right side before the operation are now recognized on that side, though not so easily as on the other. The hearing through the bone as tested by the tuning-fork is much improved (r), and even the watch to the temple previously heard only on the left, is now heard on

both, though most plainly on the left. There is no trace of the wax-like rigidity in the left foot, and that in the right is much diminished; the right foot when bent into an awkward position now falling back directly to a natural one, though not so completely as the left. The spasm of the quadriceps femoris on the right still persists. The tendon reflex is normal on the left, still exaggerated on the right, causing a twitch of the whole body, but less marked than before, while the distress caused by the tap is comparatively slight. The most marked improvement is with regard to the convulsive attacks, previously so severe and frequent, only two slight attacks having appeared since the operation.

AMERICAN NEUROLOGICAL ASSOCIATION.

TENTH ANNUAL MEETING.

First day, afternoon session.

The American Neurological Association convened at the New York Academy of Medicine, June 18, 1884. In the absence of the retiring President, Dr. Robert T. Edes, of Boston, Dr. William J. Morton, of New York, the retiring Vice-President, called the Association to order at 2:30 P.M., and after the following remarks introduced the President elect, Dr. Isaac Ott, of Easton, Pa.

Present—Drs. W. J. Morton, Ott, Bannister, Rockwell, Amidon, Birdsall, W. A. Hammond, G. M. Hammond, Spitzka, Wilder, Weber, and Gibney.

REMARKS.

In the absence of the retiring President it devolves upon me as Vice-President to call this the tenth annual meeting of the American Neurological Association to order.

In a letter from Dr. Edes to me he expresses his extreme regret at not being able to be present this year to furnish a paper, and wishes for the Association a pleasant and a profitable meeting. I cannot fill the position our retiring President would have filled in making his parting remarks. I will say but a very few words.

It is not for those who are just stepping off the official board to be seen and heard. We are of the past and must step aside, and hand over to others the insignia of office. For us there is only left a retrospect and warm words of cheer for the future. In looking back at our year just past

we may justly say that the Association has taken no backward step. More than the usual annual accession of active members have joined or are about to join our ranks. The published report of our proceedings of last year was prepared with great care and has been published entire or in part far and wide, and in many languages.

And the glance backward at the cause which we represent is full of suggestion, guidance, and assurance. Ten years ago, when this Association was first organized, none of us would have ventured to say that neurological specialism would have assumed the stalwart proportions that it to-day possesses. The special workers in neurology were few, were isolated, but they were devoted. They were men who saw plainly that the whole of medicine, its etiology, its pathology, its symptomatology, and its therapeutics could not be grasped by the ordinary human mind, especially when trammelled by the wearying and anxious routine of daily practice. In the marvellous onward strides of medical science of to-day division of labor—even of intellectual labor—became a necessity. And thus sprung up the specialist—not alone the specialist in neurology, but the specialist in many other branches. And yet to-day there are many who speak disparagingly of specialism in medicine. To these a word:

The growth of neuro-pathology has been rapid and strong. Its followers, while clinging closely to their line of study and research, have thrown back into the general fund of medical knowledge more, in my opinion, than any other separated branch of medical workers. General medicine and surgery are to-day under constant obligation to the neuro-pathologist. The general practitioner no longer dares to speak of a paraplegia, but is tolerably wise in specifying it as a lateral or posterior sclerosis, or a transverse myelitis, and so on. The surgeon, by reason of the facts of cerebral and cranial localization finds himself forced to the intricate study of cerebral centres and tracts, to say nothing of nerve-suture, nerve-section, and nerve-stretching. Neurological nomenclature, formally confined to few, is now becoming medical vernacular.

This state of things is creditable to the neurologist. It justifies him in his subdivision of labor. Could he do more, could he do an equal amount of work in all the branches of medicine, he doubtless would. As I have already said, in an address before the N. Y. Neurological Society, in referring to the subject of neurological specialism: "The very attempt to keep up in the race of accumulating knowledge begets hypocrisy and discouragement. Specialism is, then, the substitution of precision for vagueness—of a concrete differential diagnosis for an abstract supposition; it is the forced acknowledgment that the average human mind cannot practically grasp all of medical science; it is, in short, the protest of knowledge against ignorance, and it now becomes, indeed, a matter of conscience to specialize medical labors according to the tasks or talents of the physician."

The march of medical events has then fully justified the organization and continued life of this American Neurological Association. With this brief retrospect I turn to the present.

It now becomes my agreeable duty to introduce the President-Elect, Dr. Isaac Ott, of Easton, Pa.—No words are needed from me. His works have already spoken for him, and now as your President he will speak for himself.

THE PRESIDENT'S ADDRESS.

Gentlemen : At our last meeting it was with considerable surprise that I learned you had elected me to the principal office of this society. It is not proper for me to dispute the fitness of your choice, hence I thank you for the honor you have seen fit to confer upon me.

As it is the custom of this Association to demand an address, it has seemed to me that a consideration of the paths of the various fibres in the spinal cord would be a subject worthy of consideration. My remarks, as is customary with me, will be brief. It is now about seventy years ago that Charles Bell announced that the anterior roots of the spinal cord were motor and the posterior sensory. During this period many thousands of experiments have been made upon the paths of conduction of motion and sensation in the

spinal cord, with a gradual increase of knowledge. The physiology of the spinal cord, as taught to-day, is mainly due to perfections in technique—that is, the use of immovable protecting knives, and the subsequent microscopic examination of the hardened cord, two points neglected by Profs. Schiff and Brown-Séquard. I know of no more deceptive thing than to assert the extent of division of the spinal cord, without a careful microscopic examination. In regard to the paths of conduction, various opinions were held by different observers up to 1840, when Longet made numerous experiments upon the subject and arrived at the conclusion that the anterior columns were motor and the posterior sensory.

Brown-Séquard also made an extended series of experiments and believed that the transmission of sensory impressions in the spinal cord takes place chiefly through the gray matter, and partly through the anterior columns, that the voluntary impressions in the upper part of the cervical cord run in the lateral columns and in the gray matter, between them and the anterior columns; that no tactile sensations ascend the posterior columns to the brain. As to the kind of sensations conveyed upward, he made at least seven. These views, it is proper to state, have been somewhat modified by his studies upon inhibition. Prof. Schiff's idea of the spinal cord is that the posterior columns conduct tactile impressions, that the gray matter conducts in all directions afferent impulses which give rise to affections of the general sensibility, and such afferent impulses as are paths of reflex action. His theory of the spinal cord is as follows: if at any segment of the spinal cord the white matter is completely divided, and the gray is the only conducting link, then tactile and voluntary movements are absent in the parts below the injury, though violent stimulation of those parts will give rise to pain) and reflex actions in them may be induced by stimulation of the parts above the injury. If the gray matter only is destroyed and the white intact, voluntary and tactile sensations remain in the parts below the injury, but violent stimuli cause no pain, and reflex actions cannot be induced in them by

stimulation of the parts above the lesion. I mention these various views with which you are perfectly familiar to show that the facts put forth are greatly in need of correction. Perhaps the first observer to direct attention to the importance of the lateral columns in the conduction of voluntary motion was Türk, of Vienna, in his studies upon descending degeneration. It was reserved for Ludwig, by his experiments upon rabbits, to bring the whole subject into the area of renewed observation. He and his pupils first proved that, upon irritating the scrotic nerve, the stimuli were conveyed by the lateral columns to the monarchical vaso-motor centre, causing a rise of blood-pressure. By the same means he proved that the vaso-motor fibres ran in the lateral columns. Prof. Schiff contends that the fibres here concerned are purely vaso-motor reflex and not sensory, which may or may not be true. This objection will not be of any weight when we come to examine the experiments of Ludwig and Woroscheloff, which were made by means of the apparatus which allows the protecting knife to remain immovable no matter what the position of the animal at the time of cross-section. They proved that, for the lumbar cord of the rabbit, sensory and motor fibres ran in the lateral column. Afterward, in conjunction with Dr. R. R. Smith, I proved the same statement to be true for the cervical segment of the spinal cord of the rabbit. To these experiments the objection was rightly made that the animal was not permitted to live for a considerable time after the operation. But experiments of mine on kittens who sustained their injuries for several weeks, proved that in addition to the lateral columns, the anterior contained voluntary motor fibres. Herr Weiss has also made a series of experiments upon dogs at the junction of the dorsal and lumbar segments, and permitted the animals to live for a considerable time. He arrived at the same conclusion as Woroscheloff, that the sensory and motor fibres run in the lateral columns, and that the gray matter does not directly conduct. Herr Kusmin also made several experiments upon dogs, and found that the gray matter did not conduct longitudinally. According to him the lateral columns are the important

conductors of sensory and motor fibres, that the posterior columns conduct sensibility and the anterior columns motion. The only recent observer who still defends the theory that the motor and sensory fibres do not lie mainly in the lateral columns is K. Osawa, who worked in Prof. Goltz' laboratory. His theory is that section of both lateral columns diminishes the sensibility but not motility. He operated upon dogs, lifting the spinal cord slightly out of the spinal canal by a curved needle and then making a section. Whilst the original work is out of print, I see no reference in abstracts to a careful microscopic examination of the spinal cord. Brown-Séquard states that the smallest quantity of gray matter suffices for the purpose of conduction, and I wish to state that in kittens I have seen a layer of white matter of the lateral column, about the thickness of the spinal dura mater, suffice to conduct sensation and motion in such a complete way that no marked difference was seen except the ataxia. All these experiments go to show that the lateral columns are the principal conductors of sensation and motion, that the gray matter does not directly participate, that the anterior columns conduct voluntary motion. As regards the posterior columns I can substantiate Prof. Schiff's assertion that, after bleeding a rabbit and dividing the whole cord except the posterior columns, impressions of touch are conveyed by the posterior columns. That tactile impulses also pass up the lateral columns is also true, as can be shown by the pupil test, which takes place through the lateral columns. These are the chief points at which I have arrived after considerable experimentation upon the spinal cord. I have not referred to the recent works of comparative anatomists, but in the main they are in accord with these views.

I also should like to state that decussation of fibres in the central nervous system is quite extensive ; thus the motor, sensory, vaso-motor, sudorific, and inhibitory, the two latter running in the lateral columns, all cross over each other.

The next order of business was the reading of the minutes of the last annual meeting. Dr. MORTON moved that as they had been published, the reading of the minutes be dispensed with. Carried.

The Council reported, recommending election to active membership: Dr. Sarah J. McNutt, of New York, endorsed by Dr. E. C. Spitzka; and Dr. G. Betton Massey, of Philadelphia, endorsed by Dr. C. K. Mills.

Dr. W. A. HAMMOND asked—How is it that these candidates are recommended for membership and have not been proposed in open meeting?

Dr. AMIDON.—We did not find any by-law stating that it was necessary that candidates should be proposed in open meeting.

Dr. HAMMOND.—I would like to ask why it is, then, that Dr. Corning's name was not reported upon, whom I nominated last year.

Dr. MORTON.—That can be answered by the explanation that the Council were not able to agree on the name of Dr. Corning, and that the by-law is susceptible of a double interpretation on the point as to whether it is necessary to make a nomination in open meeting.

Dr. SPITZKA.—I would ask, what is to be gained by the last procedure. If the Council is unable to agree, the nominator has another privilege, and that is, to nominate and let the nomination go before another Council, and there is but little advantage in the change.

Dr. HAMMOND.—I would like to inquire what the reason was that Dr. Corning's name was not reported upon. Was not the paper which he submitted a suitable one?

Dr. AMIDON.—The reason why his name was not reported upon was because Dr. Morton voted aye, and I voted nay.

Dr. HAMMOND.—Did you read the paper?

Dr. AMIDON.—No, sir.

Dr. HAMMOND.—Then you voted prejudiced against the candidate, and I make that as an open charge in the Society.

Dr. SPITZKA.—I think there is a way of getting around that point without making open charges in the Society. The Council in the past has been in the habit of reporting upon those candidates who are reported upon favorably, and without mentioning the names of those who receive

the unfavorable action of the Council. Now, I submit that it would be well to report upon all candidates—those who are and those who are not rejected by the Council,—and in that way the Society will have the opportunity to accept or not to accept the report of the Council.

Dr. HAMMOND.—It is no matter about that. The other candidates have been recommended, and it is supposed that the papers were read and reported upon. In this case the paper was not read, and his name is not returned favorably. Now, I say that this is a disgraceful act in the report of the Council.

Dr. MORTON.—I must say a word in defence of the Council. In an informal discussion on the candidate referred to by Dr. Hammond, I found that we could not agree, and therefore took no action, and since the case could not be acted upon, it was allowed to stand in *statu quo*, leaving it to be brought up at the next meeting of the Council. I do not think Dr. Hammond should find fault with that. With regard to not reading the paper, I beg to say that Dr. Amidon is not in fault with regard to that. Section five of the by-laws says that all papers shall be forwarded not later than one month before the annual meeting.

Dr. HAMMOND.—That does not apply to candidates' papers. Besides, it had been always customary to nominate every member in open meeting, and therefore the action of the Council in these other cases is irregular.

Dr. MORTON.—I think the record will show that it has been done previously, since neither the by-laws nor constitution make any mention of the manner in which it should be done.

Dr. WEBER.—I would ask how many members of the Council of the American Neurological Association make a quorum?

The PRESIDENT.—There is no statement in the by-laws on that point. There are five members in the Council.

Dr. WEBER.—I take it for granted, then, that a Council meeting of two was not a meeting of the Council, and therefore that this report is null and void.

Dr. MORTON.—There is no specification in the by-laws as

to how many members of the Council constitute a quorum. It simply says that the Council shall do so and so.

Dr. HAMMOND.—But in the rules of all deliberative bodies when no quorum is mentioned, a majority of the entire number of members shall constitute a quorum.

Dr. SPITZKA.—I move, as there seems to be some question as to the legality of the meeting of the Council, that the report be laid upon the table, that the by-laws be suspended, and that we proceed to ballot for the candidates before the Society.

Dr. WILDER.—I would suggest that the motion be divided.

Dr. SPITZKA.—I would move, then, that the by-laws be suspended, and that the Society proceed to vote upon the reception of the candidates.

Dr. WEBER.—How shall we know how to vote, not having read the papers of the candidates? nor have we any information concerning their contents.

Dr. SPITZKA.—I withdraw my motion.

Dr. WEBER.—I now move to lay the report of the Council upon the table. The motion was seconded by Dr. Morton, and carried.

Dr. WEBER.—I now move that the papers be referred back to the Council to be read by the majority of the Council, and that a report of the Council be submitted thereon to-morrow.

Dr. AMIDON.—I do not think such a motion is necessary. The Council is supposed to meet before every meeting, and report with regard to business, etc., and if a quorum is present it will meet and report this evening.

Dr. HAMMOND.—The proper motion to make would be to not receive the report. It is not before the Society, as the nominations should have been made in open meeting before any action was taken with regard to them.

Dr. MORTON.—There is now a regularly elected Council in existence, and I do not see why this matter does not drift into the regular order of business.

The Society then proceeded to the regular order of business.

Dr. AMIDON read the report of the Treasurer, which, upon motion, was accepted and adopted.

NOMINATION OF CANDIDATES.

Dr. R. W. AMIDON nominated Dr. Sarah J. Mc Nutt, of New York. The nomination was seconded by Dr. W. A. Hammond.

Dr. W. A. HAMMOND nominated Dr. J. Leonard Corning, of New York. The nomination was seconded by Dr. Ott.

Dr. W. R. BIRDSALL nominated Dr. George W. Jacoby, of New York. The nomination was seconded by Dr. Spitzka.

Dr. E. C. SPITZKA nominated Dr. G. Betton Massey, of Philadelphia. The nomination was seconded by Dr. W. A. Hammond.

Dr. W. J. MORTON nominated for associate member S. F. Danillo, M.D., Privat-Docent at the Imperial Academy of Medicine, Physician to the St. Petersburg Clinic, formerly in the laboratories of both Vulpian and Charcot. The nomination was seconded by Dr. Weber. Dr. Morton, in connection with the nomination, submitted to the Association several monographs written by Dr. Danillo.

On motion the nomination of candidates was closed.

NOMINATION OF OFFICERS.

For President, Dr. R. W. AMIDON nominated Dr. Burt G. Wilder, of Ithaca.

Dr. W. A. HAMMOND nominated Dr. C. K. Mills, of Philadelphia.

On motion the nominations for President were closed.

For Vice-President, Dr. W. A. HAMMOND nominated Dr. Leonard Weber, of New York.

On motion the nominations for Vice-President were closed.

For Secretary and Treasurer, Dr. E. C. SPITZKA nominated Dr. G. M. Hammond, of New York.

Dr. W. R. BIRDSALL nominated Dr. R. W. Amidon, of New York.

On motion the nominations for Secretary and Treasurer were closed.

For Councillors, Dr. R. W. AMIDON nominated Dr. W. R. Birdsall, of New York, and Dr. W. J. Morton, of New York.

Dr. W. R. BIRDSALL nominated Dr. E. C. Seguin, of New York.

On motion the nominations were closed.

The President appointed Drs. W. J. Morton, of New York, and H. M. Bannister, of Chicago, Tellers, and, as a result of balloting the following officers were elected :

President, Dr. Burt G. Wilder, of Ithaca, New York.

Vice-President, Dr. Leonard Weber, of New York.

Secretary and Treasurer, Dr. G. M. Hammond, of New York.

Councillors: Drs. W. R. Birdsall and W. J. Morton, of New York.

The Association then proceeded with its scientific work.

The first communication was by Dr. B. G. Wilder, of Ithaca. "Exhibition of Preparations Illustrating (*a*) the Existence and Circumscription of the Portæ (Foramina Monroi) in the Adult Human Brain ; (*b*) the Presence of the Crista Fornicis in Fœtal and New-Born Human Brains ; (*c*) Two Additional Cases of Absence of the Callosum in the Domestic Cat ; (*d*) the Covering of the Cerebellum by the Cerebrum in a Young Chimpanzee whose Brain was Hardened within the Skull.

Remarks on Dr. Wilder's Communication.

Dr. R. W. AMIDON, of New York, exhibited a human brain wanting the callosum. The specimen had been loaned to him by Dr. Frank Ferguson, of New York, who had already presented it to the New York Pathological Society, and of which a complete history would be subsequently published in the journal, edited by Drs. Mc Bride and Spitzka.

Dr. E. C. SPITZKA said with regard to the question of the cerebrum overlapping the cerebellum, the specimen presented by Dr. Wilder illustrated how important mere morphological comparisons were in reaching definite conclusions. It was an error to suppose that preponderance

of the cerebrum over the cerebellum was a sign of high development. On the contrary, the cerebellum being an important midway station, as it were, through which all the fibres that originated in the spinal cord traversed to be transported toward the cerebrum, it stood to reason if there was any intimate relation between the two bodies, both must progress more or less equally. As we proceed from the lower to the higher forms of animal life, it is not in the fact of the cerebrum or of the cerebellum becoming more developed, but that in the cerebrum we find differences in size and evidence of hemispherical preponderance over the vermiform lobe, so that when we proceed from the anthropoid apes upward we still find overlapping, and that the lesser overlapping is really a sign of a higher development. In the lower monkeys the overlapping is remarkable, and reminds one of the overlapping seen in the brain of the human embryo, so that when you separate the hemispheres when the brain is very small you will see the corpora quadrigemina develop immediately in front of you. The higher the development the less the overlapping is quite contrary to the conclusions formed by Dr. Chapman, who started out with the view that the cerebellum was not overlapped by the cerebrum, and in defence of that theory he presented a series of anatomical specimens, but the real fact was that he allowed the brains which he prepared to lie upon the bottom of the glass vessel and flatten out, as has already been suggested by Dr. Wilder. Dr. Spitzka had seen more than one human brain removed by the ordinary methods which showed variation not only with reference to the degree of overlapping, but showed the cerebellum to be already to one side, and perhaps the crura broken, by the straining which had been placed upon the specimen when removing it.

Dr. WILDER thought that a vast amount of printer's ink, time, and some temper would have been saved had certain anatomists undertaken to be sure that their brain specimens were of normal shape before undertaking to publish any figures or description, much less draw any deduction thereon. If he were to urge one thing more than another in the study of comparative anatomy it would be to urge

that proper methods be taken in the removal and subsequent preparation of these anthropoid brains, and it was certain that had such methods been observed neither Dr. Chapman nor any one else would have advanced any such notion as had been advanced, and therefore controversy could have been avoided.

Dr. SPITZKA directed attention to the somewhat sensational contribution made by Benedikt, of Vienna, who had stated that in criminals the cerebellum is uncovered by the cerebrum. In a subsequent investigation and discussion of this point by Meynert and H——, they showed that the lack of overlapping was due to precisely such methods of preparation as Dr. Chapman had resorted to in his investigations of the brain of the chimpanzee, laying the brain unsupported flat upon its base at the bottom of a vessel.

Dr. WILDER thought that without sacrificing the skull, the brain, if it is removed in the dura mater, could be well preserved, as when the dura and the brain become filled with alcohol the dura becomes quite tense and the brain assumes nearly the form it had in the skull. The brain so swells that it fills the dura completely, and is tense like a ball, and there is but little, if any, difference in its shape as compared with what it had during the life of the individual. His method of removing the brain in the dura mater was to open the skull as low as possible, using nippers in the skull and removing the dura with the spatula, according to the directions which he suggested at the last meeting of the Association.

On account of the absence of several members who were expected to contribute statistics on the subject of tabes dorsalis and syphilis, the reading of the paper by Dr. E. C. Seguin, of New York, was postponed until some future session of the present annual meeting.

The Society then adjourned to meet at 8:30 P.M.

First day, evening session.

The Association was called to order at 8:30 P.M. by the President.

Present—Drs. Ott, Amidon, Wilder, Dana, Spitzka, Rockwell, Birdsall, Webber.

The minutes of the afternoon session were read and adopted.

The Council reported favorably on the nominations for active membership of Drs. Sarah J. McNutt and George W. Jacoby, of New York, and G. Betton Massey, of Philadelphia.

Dr. SPITZKA moved that the consideration of the report be postponed until to-morrow.

Dr. AMIDON.—That involves a change in the by-laws.

Dr. SPITZKA moved that the by-laws be suspended. The motion was seconded by Dr. Rockwell. Dr. Spitzka thought it well that the matter should be brought before the Society as a whole, in view of the palpable violation of the by-laws with regard to one candidate, as shown by the proceedings of the afternoon session.

Dr. WILDER.—As profound as my respect for Dr. Spitzka's judgment is, and as ardent as is my wish to accede to what he desires, I think the motion to postpone involves the more serious objection of attempting to overrule what I prefer to regard as the deliberate action of the part of the Association elected to transact certain business for us and to preside over us. I should think we would be making a very dangerous precedent, indeed, if we adopt the course proposed by Dr. Spitzka.

Dr. SPITZKA.—I fully coincide with the views just presented by Dr. Wilder; but, at the same time, I think it was made so painfully evident to a large number of the members of the Society at the afternoon session that the Council did not do its duty, but flagrantly violated its duty,—did not even condescend to consider the paper of the candidate,—that I have made the motion simply as a matter of principle. If it is shown, as was shown so glaringly this afternoon, that personal pique, and feeling of a lower character even, animated the Council, I think it is high time that we should know it, and settle it in a way which will prevent, if possible, any thing of the kind ever occurring again. My object in moving to postpone the report is not

to place myself in a position of antagonism to the report, but it is made in order to allow the Association as a whole to pass upon a very important matter indeed. If the Association pass over the matter as it stands now, however, it can be brought up in another form.

Dr. WEBBER, of Boston, asked whether, when the subject was referred back to the Council, there was an understanding as to what time the report should be made.

The PRESIDENT.—I do not know that any definite time was stated at which the Council should report.

Dr. WEBBER.—Was there any expectation that it would report to-night?

Dr. SPITZKA.—I think that they were to report to-morrow. I think that was the idea in referring the matter back to the Council.

Dr. WEBBER.—If there was any definite understanding concerning the time when the Council should report, that motion should be considered; but if there was no special understanding on that point, there has been time sufficient for the Council to reconsider their views, and be ready for their report, and those who were interested this afternoon should be here this evening, if they wish to vote upon the subject. I do not see any reason why there should be any postponement of action on the report of the Council.

Dr. AMIDON.—The report of the Council this afternoon was laid upon the table because it was thought to be illegally made, from the fact that of the five members of the Council only two members were present at the time the action of the Council was taken which formed the basis of the report. After the afternoon session the President called a meeting of the Council, and four members were present, and the Council arrived at the report presented, and that, it seems to me, should be final.

Dr. SPITZKA.—Dr. Amidon has forgotten to say that one of the gentlemen of the previous Council had neglected to read the paper of the candidate, and that was one of the material defects upon which I based my remarks a while ago.

Dr. WILDER.—Did the other members of the Committee read the paper?

Dr. AMIDON.—Not that I know of.

Dr. WILDER.—I took it for granted that one member of the Council read the paper, and that the other trusted to him in the matter. It is not always possible, or at least practicable, for every one of the members of the Council to read every paper; and, with my feeling of regret that what did occur this afternoon should have occurred, I still feel that we have elected a President and have associated with him other officers and two members constituting the Council, and in this report three other members besides the President are represented. Therefore, unless we are prepared to accuse them of injustice in the face of a serious and sober suggestion made this afternoon,—unless we are prepared to do that, and declare them lowered in our estimation, we should uphold their action in the report for this evening.

Dr. SPITZKA.—I technically agree with Professor Wilder. I did not intend to throw any reflection upon the Council which met this afternoon. I think we are bound by their action. But I do not think we should be hasty in adopting their report when there are so many other members personally interested in the matter, as I am not. It is perfectly indifferent to me as to whether a given candidate is elected or not, but the glaring existence, this afternoon, of something which I hesitate to characterize, and which I fear has been infused into the second meeting of the Council, has induced me to offer the motion which I have made. I wish, however, to withdraw my motion, and will state that I wish to give notice of a proposed change in the by-laws which shall come up for consideration next year.

With the consent of Dr. Rockwell, who seconded Dr. Spitzka's motion, the motion was withdrawn.

Dr. WILDER moved that the report of the Council be accepted and adopted.

Dr. SPITZKA moved that so much of the report of the Council be adopted as related to the recommendation of three candidates for active membership—Drs. McNutt, Jacoby, and Massey.

Dr. AMIDON.—I ask for information if Dr. Spitzka's motion does not involve a suspension of the by-laws.

Dr. SPITZKA.—There are negative features in the report of the Council. It is a notorious fact that other candidates were proposed, and it is also known that a contest arose about that very question, and in order to give a fair opportunity for discussion, the motion which I made allows the negative portion of the report to be taken up at any future time, while it allows the candidates reported upon favorably to be elected at once.

Dr. WEBBER.—I do not understand that there is any negative portion in the report. The report is positive, and recommends to the election of active membership all three of the candidates, and when we have balloted upon these candidates the matter is ended, and there are no negative features.

Dr. SPITZKA.—Then I call for a complete report of the Council.

Dr. BIRDSALL.—That would require another meeting of the Council.

Dr. WILDER.—I do not think the gentleman has any right to force a negative statement upon the Association.

Dr. SPITZKA.—The matter, as referred back to the Council, and in its hands, was this: there were four candidates to be reported upon. Three have been reported upon, and the other has not been reported upon, and that is the negative portion of the report. Why is this business done in secrecy, and not above board? That is what we wish to know, and that is the only object I had in making the motion which I do with reference to the report of the Council.

Dr. WILDER.—I must be allowed to say that I have no such information, nor have I any such suspicion. I could not conceive that the gentleman whom I had in mind can possibly be the candidate referred to from the fact that he has been present this afternoon and is present this evening.

The amendment offered by Dr. Spitzka was lost.

The original motion, as offered by Dr. Wilder, that the report of the Council be accepted and adopted, was carried.

The President appointed Drs. Dana and Rockwell tellers, and the Association proceeded to ballot for candidates for active membership reported favorably by the Council, and they were all unanimously elected.

THE WILLIAM A. HAMMOND PRIZE.

Dr. AMIDON read the report of the committee—Drs. F. T. Miles, of Baltimore, J. S. Jewell, of Chicago, and E. C. Seguin, of New York,—announcing that no essay of sufficient merit had been presented for the prize, and that consequently it was not awarded.

Dr. WILDER moved that the report of the committee be accepted and adopted. Carried.

MISCELLANEOUS BUSINESS.

Dr. E. C. SPITZKA, of New York, then gave formal notice of a proposed amendment to the by-laws, adding a clause which provides for an executive session in which all business of the Association, such as the election of members, officers, etc., shall be transacted.

SCIENTIFIC WORK.

Dr. B. G. WILDER, of Ithaca, then read a paper on “Macroscopic Encephalic Nomenclature.”

Like other studies of the subject by the same anatomist, the general purpose of this paper is to facilitate the advancement and dissemination of our knowledge of the coarse anatomy of the brain by reducing the difficulties now presented by the undigested mass of ponderous, polynomial terms now employed.

Professor Wilder urges the adoption of *technical, brief, monomial* terms, most of which may be had by subjecting those in common use to *abbreviation, translation, and combination*.

He also suggested that more frequent and systematic use be made of the various methods of classifying the encephalic parts, and thus their names, in accordance with the segmentation of the organ, its constitution by cavities and parietes, and the division of the latter into commissures, etc.; and especially the recognition of certain parts as *hypertrophied, atrophied, and marginal* (*tænia, fimbria, crista, habena*,) etc.

Specific recommendations were (1) the substitution of *mesen, præn*, etc., as *abridgments* (not abbreviations) of *mesencephalon, prænencephalon* and other segmental names;

(2) the designation of the ventricles by the Greek *κοιλία* (*cœlia*) in composition with the segmental prefixes, which would give *mesocœlia* (*mesocèle*), etc. In this connection attention was called to the substantial coincidence of Prof. Wilder's series of *cœlian* names (first published in March, 1881) with the names more recently proposed by Prof. T. Jeffrey Parker, of New Zealand.

On motion by Dr. Amidon the discussion of the paper was postponed until Thursday afternoon.

Dr. A. D. ROCKWELL, of New York, then read a paper entitled "Tonic Spasm of the Diaphragm(?)"

The following case was still under observation, and had been for a long time. It was unique in character, and, for that reason, and because its pathology was so obscure, he had been constrained to present it to the Association in the hope of exciting an expression of opinion concerning its character.

Mrs. X—, thirty-five years of age, the mother of four children, began first to suffer from the paroxysms of distress about twelve years ago. They had remained substantially the same both in kind and severity as when they first appeared but their recurrence had been marked by uncertain and varying intervals. Before January, 1884, they seldom occurred more than once a year; sometimes two and three years intervened between the attacks. From January to April she had two attacks, but for two months subsequently the attacks were so frequent that the count became lost. For some time they occurred every day, and occasionally twice a day, and were fast wearing the patient out. Latterly they had occurred between five and seven A.M. The patient is awakened from a sound sleep by a vague feeling of pressure and distress which is felt about the lower end of the sternum, over the epigastrium, and extends to the corresponding point in the back. It was described as if a crushing weight were being applied, as if the front and back were being pulled together. The recumbent position during the attack was impossible, and the patient leaned forward, moved about, or rested against some support, with short gasping inspirations, pallid countenance, and with an agonizing expression, until the paroxysm either subsided or an anæsthetic was administered. The pulse becomes weaker and somewhat less frequent, but is not at all irregular.

The attacks last from twenty minutes to three fourths of an hour, and leave the patient much prostrated, from which she rallies quickly, however, but a bruised sore feeling remains for many hours.

After the attacks became so frequent many efforts were made for her relief, with electricity in all its forms, together with internal treatment, and all unsuccessfully. Dr. Rockwell finally resorted to the actual cautery ; no attack had occurred for nearly one month, and the general health of the patient had improved steadily.

A difficulty, perhaps, in accepting the diagnosis, tonic spasm of the diaphragm, was found in the fact that there had never been, even during the severe attacks, any change in the contour of the external surface, no drawing in of the parts at the attachments of the diaphragm, nor projection of the epigastrium. Any attempt at swallowing, also, was always successful. Nevertheless, Dr. Rockwell was quite convinced that the symptoms were due to a spasmodic contraction of the diaphragm, notwithstanding the absence of certain objective symptoms, such as expansion and immobility of the lower half of the chest, projection of the epigastrium, closure of the œsophagus, which he had found emphasized in print and speech.

Remarks on Dr. Rockwell's Paper.

Dr. WILDER asked the reader of the paper if the pain described was similar to ordinary cramp in muscles.

Dr. ROCKWELL said that it was very similar.

Dr. DANA asked on what grounds angina pectoris was excluded.

Dr. ROCKWELL replied that the pain seemed to be rather low down for angina pectoris, in the epigastrium and extending through to the back to a point directly opposite. It seemed to him to be so entirely different from angina pectoris, of which he had seen a number of cases, that he had excluded that affection.

Dr. WEBBER asked where the cautery was applied.

Dr. ROCKWELL said it was applied all along the spine from the nape of the neck to the waist.

Dr. BIRDSALL asked Dr. Rockwell if he had satisfied himself with regard to the absence of hysteria and hepatic calculi.

Dr. ROCKWELL said that gall-stones had been excluded, that there was no evidence of hysteria in the case, but that the existence of hepatic calculi he had not considered very thoroughly.

Dr. DANA thought it would be physically impossible for the diaphragm to be in a state of tonic contraction without the abdominal muscles being tense or protruding, as this was one of the most noticeable phenomena produced in experiments on animals.

Dr. ROCKWELL said that that was just the point upon which he wished to get some light, and he was desirous to know exactly what the condition was. He made the title of his communication tonic spasm of the diaphragm, with an interrogation point. He was aware that spasm of the diaphragm was of very infrequent occurrence, yet while experimentation showed that there was change in the contour of the abdominal muscles when it existed, he was not prepared to say that slight spasm occurring in a very sensitive person might not take place without producing any noticeable change in the condition of the abdominal muscles.

Dr. SPITZKA asked Dr. Rockwell if there was any change in the action of the respiratory muscles.

Dr. ROCKWELL said that the only thing which he had noticed was a slight fluttering—only very slight—at the epigastrium. How much it had to do with the action of the respiratory muscles he was unable to say. The breathing of the patient was gasping and short, and was performed largely by the upper portion of the chest, but he did not notice any lateral expansion of the walls of the chest.

Dr. SPITZKA remarked that the objection urged against the existence of tonic contraction of the diaphragm because there was no change apparent in the abdominal muscles, might be overcome and explained if there was any change in the action of the respiratory muscles, especially if the tonic contraction of the diaphragm was only slight.

The Association then adjourned to meet on Thursday at 2 P.M.

Thursday, second day, afternoon session.

The Association was called to order at 2:30 P.M., by the President.

Present—Drs. Ott, Amidon, Gibney, Birdsall, W. A. Hammond, G. M. Hammond, Weber, Massey, Bannister, Wilder, Rockwell, Gray, Mills, McNutt, Dana, Webber, Bartholow, and Walton.

The minutes of the last meeting were read and approved.

Dr. W. A. HAMMOND, referring to the report of the committee on the prize essay, said that his intention was in offering a prize that the committee should have the power to reject all essays. The idea was not to offer a prize for a *paper* upon the functions of the optic thalamus, but a *prize* for original observations on the functions of the thalamus in man, with special reference to its perceptive faculties.

After some further explanation and discussion, Dr. WILDER moved to strike out of the minutes so much as related to a reference of the report back to the committee.

The Council reported favorably on the nomination of Dr. Danillo for associate member.

Dr. W. A. HAMMOND.—Has there been any report made upon the nomination of Dr. J. Leonard Corning—not upon his name, but upon his paper? As I understand it, the Council has no power to keep the Society from voting upon any candidate who may have been nominated in the regular order. If the Council has not made any report upon Dr. Corning's paper I move that the Society proceed to ballot upon the name of Dr. Corning for membership. I have taken pains myself to read his paper, and I am willing to say that any member of this Association might have been proud to have written it. It is true that it contains a great deal of material which has already been known, but he has brought out the matter in a different shape from that in which it has heretofore been presented, and he has also introduced more or less of original material. If there is no objection to the paper I should like to know what the objection is to Dr. Corning becoming a member. He has written a book, has contributed numerous articles to medi-

cal literature, and, as far as I know, is in good standing in the profession. If he has done any thing which is derogatory to the professional standard, I should like to know it so as to vote against him. But if there is no such evidence, I do not think any personal feeling should prevent the Society from acting upon the nomination. I therefore move that the Society proceed to vote upon the name of Dr. J. Leonard Corning for membership. There is nothing in the constitution to prohibit this action, even though the Council has not made any report. Even if his paper was not of the highest scientific order, that is not a reasonable objection against him. I think the Association has a right to vote upon the candidate, and I make that motion.

Dr. W. R. BIRDSALL.—I rise to second Dr. Hammond's motion for the reason that I wish to explain my position as a member of the Council, and as to what I understand to be the functions of the Council. I agree that the Association can overrule any action of the Council and accept any candidate upon whose paper the Council has made an unfavorable report, although such has not been the usual course. It seems to me that if the report of the Council is called for they have simply to report whether a candidate's paper was accepted or rejected, and the grounds on which the rejection was made, if made, it is not proper to furnish. The reason for rejection is often too delicate to be brought out, and the simple fact of rejection by the Council is evidence that they have some good reason for rejecting the candidate, and it must rest upon that ground, and the Association must rest content with the judgment of such men as they have elected to fill those positions and discharge the duties of Council. Still, as I have already said, the Association has a right to elect any member without reference to the action of the Council.

The objection raised yesterday with regard to the question of quorum does not involve the meeting of the new Council, as four members out of the five constituting the Council were present. The objection raised that the paper should have been read was proper. I think no paper should be passed without sufficient study of its contents to enable

the members of the Council to judge of its value, and as a member of the Council I know that this has been complied with.

Dr. HAMMOND.—My friend, Dr. Birdsall, whose motives no one who is at all acquainted with him will for a moment question, is entirely mistaken with regard to giving reasons for rejection of a candidate. Every committee of every society or organization is bound to give its reasons for its actions, and it does give its reasons, and the society has a right to call for them if it does not give them. This is a rule which obtains in the House of Congress and in all legislative bodies, and I think the Association has a right to insist upon this here. Dr. Corning's paper is a good paper, it is expressed in good English, has good spelling, good logic, and I do not see why it is not a paper which should entitle him to admission to the Association.

Dr. WEBBER, of Boston.—I think it would be better to postpone discussion upon this subject, as there are a good many present who are not members of the Association, and it would be far better to discuss it in some executive session.

Dr. HAMMOND.—But there are no provisions in the by-laws for an executive session.

Dr. WEBBER.—Then I move that the matter be laid upon the table until the scientific work of the Association is finished.

Dr. HAMMOND.—I hope that motion will not prevail as it is the easiest thing to come to a vote directly. All that is necessary to settle the question is to come to a vote, and no matter how it shall go I shall be satisfied. All I ask is a vote.

Dr. WEBER, of New York.—If the Council will not inform the Association why they rejected this candidate, it nevertheless will be understood that there is some good reason for its action, and if we go on as Dr. Hammond suggests, the great probability is that the candidate will be rejected, and therefore it will be better for the candidate not to have a vote upon the question at the present time.

Dr. HAMMOND.—Oh, no. That remains to be seen. It

is not the function of the Council to inquire concerning the candidate. All they have to do is to decide on the scientific value of his paper. He may be a pickpocket as for that matter. All they have to do is to judge of the merits of his paper.

Dr. BIRDSALL.—I would ask for the reading of the by-laws regarding the function of the Council.

The secretary read the section of the by-laws relating to the function of the Council.

The Association then voted upon the motion to lay the subject upon the table. The motion was lost.

Dr. HAMMOND.—I now renew my motion, and move that the Association proceed to vote upon the name of Dr. Corning for active membership.

Dr. WEBBER, of Boston.—I do not know how it is in New York, but when there is a council of any society in Boston to decide upon a candidate, there is provision in some societies that if the council do not report favorably, the person proposing that candidate has the liberty to bring the name before the society; while in other societies the action of the council is absolute, and that finishes the matter. I do not know how it is here in this Society.

Dr. HAMMOND.—There is no provision in the constitution and by-laws with reference to the action of the Council of this Society being final.

The secretary read article eight of the constitution.

Dr. WEBBER.—It seems to me from the reading of the article of the constitution, that it provides for the election of a member independent of the report of the Council.

Dr. BIRDSALL.—I would like to say concerning the action of the Council, that the name of the candidate is presented before the Council and balloted upon, and that it is not necessary that the secretary of the Council should give any of the details of the conversation held between the members; but if the Society chooses, it can call for the result of the vote of the Council simply.

Dr. HAMMOND.—Then I should like to know how the vote stood; how many were present, and how the vote stood.

Dr. AMIDON said that there were present at the meeting of the Council Drs. Ott, Birdsall, Gibney, and himself, and that when the vote was taken three ballots were cast, of which two were against the candidate and one for him, and one member of the Council did not vote at all.

Dr. HAMMOND.—Did the president vote?

Dr. AMIDON.—I decline to answer.

Dr. HAMMOND.—I ask, did the president vote?

The PRESIDENT.—No, sir.

Dr. HAMMOND.—The president would have voted aye, if he had voted, for he seconded the nomination of Dr. Corning, but he refrained from voting on grounds of delicacy. If he had voted, therefore, the vote would have been a tie-vote.

Dr. AMIDON.—I could believe that this action on the part of one, a distinguished member of this Association, was intended in good faith, did I not know the source from which it comes. But, unfortunately, being the subject of frequent personal abuse of like character from the same source, I will leave it. As I look upon it, the Council of the Association is the door-keeper of the Association, and is responsible for the members who are admitted to this body. There are members now who abstain from the meetings of the Association, and who do not make any scientific contributions to the Society; and there are still other members who do not pay their annual dues, and have not paid them for a number of years. The Association has a world-wide reputation, and when such men as Charcot, Bernhardt, and Erb value honorary or associate membership, and when our membership is limited to fifty, I think it is the duty of the Council to be very conservative in the admission of new members. At the meeting of the Council where we acted upon the papers of candidates, I read Dr. Corning's paper while the other members listened to my reading, and then we simply voted, and of the four members who were present two voted against him, and one for him, and one did not vote at all.

Dr. HAMMOND.—All that would have come with better grace if the member had made his remarks before he cast

his vote yesterday. It seems to me like the old fable of the wolf and the lamb.

Dr. WEBBER.—I do not suppose that any amount of talk will change the vote. I therefore move that the Association proceed to ballot. Carried.

The PRESIDENT appointed Drs. Rockwell and Mills tellers, who subsequently announced that the whole number of votes cast was eighteen, of which there were ten for the candidate and eight against him.

The PRESIDENT declared the candidate elected.

Remarks on Dr. Wilder's Paper on Encephalic Nomenclature.

Dr. C. L. DANA, of New York.—I am unable to speak upon the subject as a cerebral anatomist, but I have taken a great interest in the paper and the work which Dr. Wilder has undertaken. I have some interest in it as a teacher, and I can therefore offer some suggestions from that standpoint. As a teacher I think that most of the points advocated by Professor Wilder are admirable, and will eventually be adopted. There are certain special things which might be refused, but I think that every one will see certain advantages in the system proposed. But, at the same time, I think Prof. Wilder speaks too much from the standpoint of the anatomist or teacher of anatomy, forgetting that encephalic anatomy, or anatomy, is not of the same kind of pure science as certain other branches of natural science are. Encephalic anatomy is not only one of the sciences, but those who are engaged in its study and teaching must give terms which medical students and medical men can easily acquire. I know that Dr. Wilder has had this point in view all the time, but I think he has made some mistakes in some terms which he has introduced. I think he has made a mistake with regard to the terms diencephalon, epencephalon. Instead of these he proposes to call them dien, epen, proen, etc. In my opinion this change is unjustifiable and unnecessary because the most of medical students do not see the terms of encephalic nomenclature very often, and when they do see these names they will have to think two or three times before they know what it

means, and there is no special harm in giving the entire word.

I should think also that Prof. Wilder has made a mistake in attempting to nickname different parts of the brain in this manner, because there are so few persons who read or see sufficient of the brain nomenclature to make it necessary to use nicknames.

I think also he has shown a tendency to increase the number of anatomical landmarks in the brain, as, for example, when he suggests the term "*ripa*" for a little artificial part of the brain, which is of rather small significance to say the most, and I do not see why he should add to the complexity of the subject by adding such terms.

I think that if he would devote the energy which he has manifested in getting up this system of nomenclature to simplifying that which already exists he would do a greater service.

I think he has made a mistake in trying to substitute certain names for common names, such as, for example, "*alba*" for "*white matter of the brain*"; "*mesocoelia*" for "*aqueductus Sylvii*," etc. I think there are several words which it is unnecessary to change simply for the sake of getting monosyllables instead of polysyllables. I also think that changing the word "*ventricle*" to "*coelia*" is not necessary, but I do not offer that as a positive objection to the substitution, only it has struck me thus far that it was not necessary to change the term *ventricle*, a word which has become a part of an anatomical thing, to the term *cœlia*.

He has also used the words "*mesal*" and "*mesen*." I think every one would agree that it is an admirable improvement. But I do not think it is necessary to carry it as far as he has done. He speaks of "*dorsad*," etc., and I think it is possible we could dispense with the termination "*ad*" and use the termination "*ly*," which is usually employed.

There is one further criticism which Dr. Wilder has in part already answered by one of the resolutions which he has offered. I think it is bold for any single man to attempt

to reform cerebral anatomical nomenclature. It is impossible to form a nomenclature which will suit all anatomists, and if he had first endeavored to secure an international committee perhaps to discuss this subject he would have done a greater service, although every one must recognize the immense value of his services already. He has given an impulse to a reform which will not cease until something has been actually accomplished.

Dr. W. R. BIRDSALL of New York.—I hesitate to say a single word upon this subject, because few of us can discuss it properly. The subject is one which has been steadily elaborated by Prof. Wilder for a number of years, and such a task can be only undertaken by one almost constantly engaged in such work, and by one who gives almost his entire time to the subject of anatomical study and teaching. It seems to me that the subject, as embodied in the resolutions which he has offered, this Association should be proud to subscribe to, and to their author as a worker who has accomplished so much as Prof. Wilder has done by his labor. Perhaps the only qualification which I would make to them is with regard to the terms especially recommended in these resolutions, and that is simply because I do not feel competent to discuss the value of these terms. When we consider how slowly nomenclatures are built up, and the curious ways in which terms are added, it does indeed seem a marvellous task to attempt to reform it in any way, and any one who shows that he is competent to do such work by his knowledge of the parts to be named is certainly deserving of thanks for his labor in that direction. We are, as a rule, disposed to leave things alone, and object to the introduction of new terms. At the same time the confusion which now exists might be greatly simplified by making terms briefer, and restricting certain words and converting certain sentences into words. I can, on the other hand, see an objection to doing this, especially in nicknaming certain parts. If the term now in use means any thing it is of advantage to keep it whole; if it is a description of a certain organ, or resemblance of that organ to an absolute or fancied body, it is of advantage to retain it, provided it is

not too cumbersome. In making changes in the nomenclature, when we come to provide terms which will substitute a single word for a greater part of a sentence, we take the risk of losing the advantage of description given by the complete sentence, and as it occurs in general anatomy we lose the derivation of medical terms. It is true that so many of these terms have been made from fancied resemblances that in looking them over one would judge the poet had been over the ground instead of the scientist. In making changes which should bring about uniform nomenclature, we might take Chinese terms and apply them to certain tracts in the brain perhaps with advantage, because the student would know such and such terms indicated such and such organs or parts of organs, but it might be questionable whether such a system would possess any ultimate special advantages. But Prof. Wilder's method seems to have been, according to what has usually obtained, to retain the classical languages, Latin and Greek, and retain where possible a description which is in keeping with the real name and thing, as "mesencephalon," for example. But in writing I can see why the first part of the word alone might be of advantage. As far as speaking is concerned, I think it is about as well to use the whole term as to employ a part of it.

The objection which has been raised, that certain minute portions of the brain might as well not be named, is one which may or may not be open to objection. Many insignificant parts of the brain have been named, while on the other hand many parts have not been named which are very important parts when we consider their relation to embryology, etc.

From the standard of the evolutionist, who studies the part with reference to what it was in the embryo, some of these little points are of very great interest and well entitled to be named. It all depends upon the anatomist who claims whether they are of significance or not.

Whether a committee can do this work better than an individual is another important question. When we look at the names which have been brought forward by certain individuals, and see how they really occupy large territories

in our nomenclature as compared with any work done by the action of societies, it is indeed a question whether an individual can not go far ahead of a united action in such a matter. When we consider what Owen has done, and later Huxley, how can we doubt that single individuals are capable of making up consistent nomenclatures.

I have no detailed criticism to make upon Dr. Wilder's nomenclature, and I think that in his hands more has been accomplished than would have been by many others, and that if we arrive at any conclusion, we should ask the action of other societies and learned bodies who will co-operate with us in an amendment or further suggestion in the adoption of any plan suggested. This line of work is now international, and embraces the entire world.

Dr. WILDER.—I wish, as I am obliged to leave in a few moments, to express my gratitude for the expressions of kindness with which my paper has been received, and I should be very glad to have time to comment upon a few points which have been raised, but this I must postpone, at least until next year. I would simply say that very many of these apparently new names are not new at all. If all anatomical works were read as thoroughly as are the Grays and Quains, it would be found that I am guilty of bringing only very few monsters into the work.

Dr. W. A. HAMMOND moved that the resolutions offered by Dr. Wilder be taken up as the first item in miscellaneous business to-morrow.

Dr. G. M. HAMMOND then read a paper entitled, "Can Locomotor Ataxia be Cured?"

A few years ago when a member of the medical profession announced that he had cured a case of locomotor ataxia, his statement was not received with a great amount of interest. Belief in his views was not entertained for a moment. It was absurd even to talk about curing ataxia, and the physician was regarded as having made an inaccurate diagnosis, or else that an intermission of the disease had occurred at an opportune moment. The pathological condition found existing in the spinal cord in persons who have died while suffering from ataxia seemed to warrant the views held by

a majority of physicians that a cure of this affection and all similar ones, such as sclerosis of different parts of the cord and brain, was impossible, but as time has passed reports of cases cured have come before the profession, many of them reported by men of such undoubted learning and high reputation that we can not afford to overlook them. The question, therefore, that arises is: Are these true cases of ataxia, or is there some other morbid condition of the spinal cord which when present gives rise to symptoms similar in every respect to those resulting from sclerosis of the posterior columns? Dr. Hammond had collected a few cases of undoubted cure of what was supposed to be locomotor ataxia, and he thought their history and the treatment employed went far to settle the question of curability of posterior spinal sclerosis.

The first case was that of a patient whom he presented to the Association at its last annual meeting, when he exhibited him as a case of locomotor ataxia cured, and he was happy to say the cure had so far stood the test of time. Dr. Hammond then gave the summary of a case published by Desblat in *L'Union Médical*, November 29, 1883, and also a case which had been treated by Dr. W. A. Hammond about two years ago, and in which all the symptoms of locomotor ataxia disappeared under treatment, and the patient had remained perfectly well up to the present time. Case four was one published by Dr. Friedrich Schultz, of Heidelberg, in which all the symptoms disappeared and the cure remained apparently permanent at the end of two years. The patient remained well up to the time of his death, which occurred suddenly during an attack of acute intoxication. Nine hours after death an autopsy was held. The spinal cord was found to be small and soft, and there was found diffuse degeneration in the posterior columns in the lumbar region, together with degeneration of the outer division of the posterior columns of the dorsal region, and slight degeneration of the column of Goll. Dr. Hammond regarded this as a most instructive case. How it is possible for sclerosis of the posterior column to exist without the manifestation of any symptom of ataxia except a slight

eneuresis can only be accounted for in one way. In such a case we are forced to conclude that some other condition of the cord, co-existing with or occurring separately from the sclerosis, is capable of producing the majority, if not all, of the symptoms of ataxia, and that this morbid state under certain conditions is capable of being removed by appropriate treatment. In support of this view Dr. Hammond quoted two cases, reported by Disnos at the Société Médical des Hôpitaux, July 13, 1883. After referring to other cases, and giving a *résumé* of the cases in which cure had apparently been effected, the author of the paper arrived at the following conclusions :

1. That the absence of the patellar tendon reflex in locomotor ataxia is not always caused by sclerosis of the posterior columns.
2. That sclerosis of the posterior columns may exist without being accompanied by the ordinarily prominent symptoms of ataxia.
3. That congestion of the posterior half of the spinal cord may give rise to most, if not all, of the symptoms of locomotor ataxia.
4. That it is impossible during life to make a differential diagnosis between posterior spinal sclerosis and posterior spinal congestion.
5. That posterior spinal congestion is curable.
6. That there is no evidence to show that sclerosis once existing in the spinal cord has ever been removed.
7. That those cases of co-called locomotor ataxia which have been cured are simply cases of spinal congestion, more profound in the posterior half of the cord.

Remarks on Dr. Hammond's paper.

Dr. W. A. HAMMOND.—I did not intend to open the discussion, but as I am obliged to leave within a few minutes I will now say what I have to say. I think that, perhaps, the view that congestion and not sclerosis is at the basis of those cases which have been said to be cured, is probably correct. But upon that point I will not go further into details, and will only bring to mind a single case which has been under my observation lately. It is that of a weaver,

an Englishman, who lives in Newark, New Jersey, and who is a very intelligent man. I first saw him one month ago last Sunday, when he was suffering with all of the symptoms of locomotor ataxia. Lightning pains, exceedingly severe at night, cushiony sensations in the soles of the feet, incontinence of urine, lack of co-ordination to such an extent that he was unable to walk a single step with his eyes closed, entire absence of tendon reflex in both legs, double vision occasionally, difference in the size of the pupils, although both were largely contracted, one more so than the other. There was a history of syphilis apparently, although he was not sure upon that point. I prescribed iodide of potassium in large doses. The treatment did not affect him in the slightest beneficially, and at the end of two weeks he was in about the same condition as when I first saw him, although he was taking sixty grains of iodide of potassium three times a day with a thirtieth of a grain of bichloride of mercury. I then changed the treatment entirely, and administered codeine to give him sleep, for lack of sleep seemed to be producing deleterious effects upon him as much as any thing, and I also added one fourth of a grain of nitrate of silver three times a day, without any anticipation of special benefit following the use of the silver. But two weeks afterward to my absolute surprise, all the pains had ceased, the patient could walk perfectly well, the tendon reflexes had returned and were almost exaggerated. I can not account for such results except upon the theory of congestion affecting the posterior part of the spinal cord most markedly, and shifting to the lateral columns. So far as the ataxic symptoms went, they were entirely absent. I do not think that could be regarded as a case of sclerosis, although there were all the symptoms of locomotor ataxia present when I first saw the patient.

Dr. BARTHOLOW, of Philadelphia.—I quite agree with the author of the paper that cases of locomotor ataxia can be cured, but what kind of cases? I was once sharply criticised for reporting a case of locomotor ataxia accompanied by the statement that it could be cured by large doses of iodide of potassium, but it was a case of mercurial ataxia

perfectly well developed which got well. I have no doubt that as the metals are so largely introduced into our common modes of living that there are a great many cases of so-called locomotor ataxia which are examples of metallic poisoning. They may be perfectly typical and not distinguishable in any possible way from what should be regarded as genuine cases.

I think, also, we should draw a distinction between two classes of cases undoubtedly syphilitic. Syphilitic gummata of the spinal cord will produce symptoms of locomotor ataxia and iodide of potassium will remove them. But there is a condition of the system, induced by syphilis in its chronic form, favorable to changes in the connective tissue, changes known as sclerosis, in which the results are altogether different, and we should make a distinction with regard to conclusions drawn with reference to the action of remedies between those cases due to gummata and those due to syphilis, which acts secondarily as a cause. In that restricted sense I believe that locomotor ataxia can be cured. Furthermore, I believe that by the use of remedies unquestionable cases of locomotor ataxia can be arrested. There is, however, a great difference between arrest and restoration to the status in quo. I do not believe that any case of locomotor ataxia is curable in the sense that the status in quo is restored, but that the disease is curable in the restricted sense mentioned I have no doubt.

Dr. J. LEONARD CORNING, of New York.—The fact that the ataxic symptoms had been found during life, and autopsy made and nothing further found except hyperæmia, is very conclusive kind of evidence and must be accepted. Moreover, the theory of the possibility of reducing such symptomatic phenomena is perfectly possible on the ground of analogy. We all know the influence exerted upon the heart action by the ebb and flow of the intracranial blood, and the temporary aberrations of the senses produced inside of the cranial vault. Why may not similar conditions prevail in the spinal cord? That the spinal cord is very vascular, and that fluctuation can take place within it, is proven by displacement of the cerebro-spinal fluid, and it seems to

me, granting that such a state of things does exist, that hyperæmia is the starting-point, and that if we can arrest the hyperæmia we can arrest further deposit of inflammatory tissue. It is reasonable to say that in the striking case presented by Dr. Hammond the marked improvement in the symptoms was due to the efficacy of the therapeutical measures employed, and in the argument the case greatly strengthens the argument in favor of the hypothesis of congestion.

Dr. G. M. HAMMOND.—I may be pardoned, Mr. President, for making my remarks at this point of the discussion, as I shall be obliged to leave within a few minutes. I do not consider that symptoms resulting from spinal congestion and poisoning from metals, although they are similar to ataxia, are ataxia. Ataxia, strictly speaking, is sclerosis, and what I hold is that locomotor ataxia, true and simple, is never cured. But that these cases which are cured are those in which the symptoms result from some other trouble, whatever that may be, true sclerosis is never cured.

Dr. WEBBER, of Boston.—Last year I reported two or three cases of restoration of the tendon reflex after it had been abolished in patients in whom it had previously been present. In one of these cases I doubt whether the affection of the spinal cord was locomotor ataxia, as the patient had recovered two or three times and then relapsed. I do not suppose it was genuine locomotor ataxia, but he had all the symptoms of the disease.

In another case reported last year I was somewhat in doubt. It was still evidently a case of locomotor ataxia, but the tendon reflex returned. Another case which I reported was one which I saw before the attention of the medical profession was called to the absence of the tendon reflex, and the patient virtually recovered; but afterward, when I examined him, the tendon reflex was present. In that case an autopsy has been made, but the spinal cord has not yet been examined microscopically. Déjerine has lately reported a case in which there was diagnosis of locomotor ataxia, but when the autopsy was made the spinal

cord was found to be perfectly healthy; but there was inflammation of the nerves, multiple neuritis. Some of these cases of apparent recovery from locomotor ataxia may have been cases of neuritis instead of lesions of the spinal cord. I should be rather disinclined to accept the view of the possibility of congestion of the spinal cord lasting for weeks and months without producing any organic change, and should be inclined to say it has not been proven that such a condition does exist.

Dr. A. D. ROCKWELL, of New York.—Nevertheless, I believe that the cases of locomotor ataxia which are cured, or greatly benefited, are so few compared with the entire number, that practically it means but very little. In looking over my records I have found that I have had under observation forty-four cases in private practice, and while in the beginning I thought I had cured a number of cases, I am now quite convinced that those cases were not due to true sclerosis. Dr. Webber has also referred to a case in which the diagnosis of locomotor ataxia was made, but where the autopsy showed that the lesions of locomotor ataxia were not present, but that the symptoms were due to other conditions. I have one case in which stretching of the spinal cord was performed with some benefit, and afterward the stretching was resorted to and the patient died, and the autopsy revealed the same condition which Dr. Webber has mentioned, namely, peripheral neuritis. In those cases, which are not locomotor ataxia, I think static electricity does some good.

I reported some years ago a number of cases of locomotor ataxia, or cases simulating spinal sclerosis, and out of the fourteen two recovered, and in one of these the tendon reflex was absent, but it returned after treatment and the patient improved.

Dr. MASSEY, of Philadelphia.—As to the cases of alleged cure of locomotor ataxia, I would like to add one occurring in a gentleman forty-two years of age. He came under my observation three years ago, the case being one of four years' duration. He was an explorer, and had not taken special care of his health. In 1866 he suffered from syphilis

slightly, nothing beyond the existence of a hard chancre. Three years ago he began to have visual troubles. There was loss of tendon reflex, which was present before his sickness. He had all the symptoms of locomotor ataxia in the early stage, inability to stand with his eyes closed, sensation of constriction and pressure about the body, lightning-like pains, and decided anæsthesia below the knees, sensation of standing on cushions, and a decidedly ataxic gait. He became quite melancholic. After years of treatment he began to get well, and now three years since I first saw him he is apparently entirely cured. There is no sign, however, of return of the patellar tendon reflex. The treatment consisted in the use of proto-iodide of mercury, with galvanism to the spine and the faradic brush to the extremities. And I may say here that I think the faradic brush is an excellent expedient, it having a physiological basis. The iodide of potassium was administered in large doses at first, but it aggravated his condition and pulled him down so, that it was discontinued.

Dr. C. K. MILLS, of Philadelphia.—I have seen many cases of locomotor ataxia, and also cases of what may be called pseudo-locomotor ataxia. But I have not seen cases of what might be termed the regular type of the disease cured. When I say regular form or type of the disease, I mean that type which we recognize pathologically as posterior spinal sclerosis. I have seen, however, several cases with ataxic symptoms relieved and cured. I believe those cases with ataxic symptoms in which there is a distinct syphilitic history will be relieved by the energetic use of anti-syphilitic remedies. Some have probably real gummata of the cord, but I believe there is also a form of meningo-myelitis, a low grade of inflammation involving the membranes, and the extreme periphery of the cord itself, in which there are symptoms which simulate those of typical advanced sclerosis.

Again the cases of neuritis will cover a certain number more of those cases of locomotor ataxia reported as having been cured, and some of these cases of neuritis I believe become eventually sclerosis itself.

There are forms of general neuralgia which are cured and supposed to be locomotor ataxia. It is also well known that we have hysterical locomotor ataxia. In some instances the knowledge of having been exposed to syphilis causes the disease to be regarded as syphilitic, which is not syphilitic, but rather hysterical, and these cases are cured in the process of time. True hysterical locomotor ataxia is cured, of course, but in this disease we do not have absence of the patellar tendon reflex.

I should think it quite possible that in Dr. Massey's case there was a large hysterical element, although there was undoubted history of syphilis.

Congestion of the spinal cord may give rise to many of the symptoms of posterior spinal sclerosis, but my own impression is that we cannot really say that we have a limited congestion of a certain region of the cord. We have however congestion of the spinal cord which can be diagnosed, and it may be that in some cases congestion prevails most extensively in certain regions. Probably we have a condition of meningeal congestion or real meningeal inflammation which gives rise to these symptoms. The point which I wish to impress is this: that the typically recognized form of locomotor ataxia which is pathologically posterior spinal sclerosis is not curable.

Dr. MASSEY.—My case was evidently a typical case, or rather one which presented all the typical symptoms except pain, and including the lessened power of the sexual organs which has since improved. The patient was excessively nervous, but not given to introspection. I do not think it was a case of hysterical locomotor ataxia.

Dr. BANNISTER, of Chicago.—The discussion reminds me of one or two cases. In one there was doubt whether there was any history of syphilis, but I advised a treatment as though it was syphilis, and I reported the case nearly one year afterward as much improved. It then disappeared from observation. The other case was one in which there was a history of illness of only four or five months together, and the patient had every symptom of locomotor ataxia except there was exaggerated patellar tendon reflex. I

diagnosed myelitis involving the posterior roots and probably the lateral columns. I have had several cases in which there were symptoms of locomotor ataxia, with myelitis running a rapid course. I would ask if physicians have not observed amelioration of symptoms from enforced rest.

Dr. W. R. BIRDSALL.—I would like to report the case of a woman who gave a history of characteristic pains of locomotor ataxia for several years, and had the true ataxic walk. No other symptoms of locomotor ataxia were present except the absence of the tendon reflex. She was under treatment by galvanism applied to the spinal cord, which gave relief to the pain, and within eight or nine months all the ataxic symptoms were relieved. Up to this time the characteristic Argyle-Robertson pupil had not been present. One day, in testing the patellar reflexes, I found that she again had the reflexes, although slight, yet it was decided. The ataxic symptoms have not returned. There is beginning atrophy of the optic nerves, the Argyle-Robertson pupil has developed and she is having now areas of pains in the upper extremities. If I had not made repeated examinations myself, and had examinations made by most competent observers, I should have hesitated to pronounce with reference to the absence and return of the patellar tendon reflex. Now here is a case which, if I had written it up at the time, I could have reported as one of locomotor ataxia cured, and indeed the patient was cured for six months, and remains so as far as symptoms of ataxia are concerned. Still I regard it as a case of locomotor ataxia, and one in which there is no history of syphilis. In my own mind it seems to me that in this case we may have some involvement of the lateral columns, a lesion of which often increases the excitability of a part of the reflex arc; and it is possible that in many of these cases the arc is not completely interrupted, but interfered with to such an extent that with the ordinary reflexes we get no response, while even weaker impressions may give rise to reflexes, when other parts of the reflex arc have their excitability increased. It is only upon such a view as this that we can explain the return of tendon reflex in long-continued cases.

In another case, so far as the ataxic symptoms are concerned, the tendon reflex has not returned, but the reflexes in the thigh muscles are quite active—reflexes which are not usually observed. The ordinary patellar reflex is still abolished. Since the ataxia has disappeared he has had almost all the visceral symptoms of locomotor ataxia, such as gastric and laryngeal crises, and also the peculiar cutaneous disturbances of sensibility, particularly in the upper extremities, to heat and cold, numbness and pain, etc., for one or two years.

I think many cases have been reported as cured in which there is a long interval of interruption of symptoms, and that a sufficiently long time had not expired to enable the observer to reach the conclusion of the story. On the other hand, there are many functional ataxias which may present or simulate in many respects true sclerosis of the posterior columns; and, further, we may also have these irregular cases where localized lesions exist in some part of the cord which involve the lateral columns as well as the posterior columns, and give rise to a great variety of symptoms simulating true posterior spinal sclerosis.

With regard to the theory of congestion, I will not attempt to pronounce any opinion, except that, as has been mentioned, it seems to me that long-continued congestion can not exist without further changes than those which are merely vascular.

Dr. S. G. WEBBER, of Boston, then read a paper on "Multiple Neuritis."

Neuritis has lately assumed an importance which formerly was not accorded it. Local traumatic and rheumatic neuritis have been observed many times and their symptoms have been well described. The grosser and the more-marked anatomical changes were well known to the profession years ago. The secondary degenerations which rise in the peripheral ends of divided nerves have been known since Waller described them. More recently various trophic changes in the skin have been correctly referred to disease of the nerves.

It is only within a few years, that a more general inflammation of the nerves has been recognized. As has frequently

occurred, the disease has been seen, and cases reported at intervals, but attention was not specially attracted to the subject until Joffroy in 1879, Leyden in 1880, and Stewart in 1881, had each described cases. Even then, it was some months before the possibility of a general diffused neuritis was fully recognized, if indeed it is as yet.

Up to this time Dr. Webber had found, in the Boston City Hospital, records of *six* cases without autopsies, and *twelve* cases with autopsies; one, however, very brief. Dr. Webber gave a summary of each case.

In case 4 the autopsy was made by Dr. Gannett, who diagnosticated "Osteo-sclerosis of the skull, inhalation pneumonia, capillary bronchitis, injection of the kidneys, acute purulent pyelo-nephritis, central fatty infiltration, and cloudy swelling of the liver."

The various nerves removed showed nothing abnormal in their gross appearance. The spinal cord both externally and on section seemed to be healthy. Microscopic examination, chiefly at cervical and lumbar enlargements, showed nothing abnormal.

Sections of the nerves, stained with osmic acid, the brachial, radial, ulnar, sciatics, pneumogastric, recurrent laryngeal, phrenic, showed disease in all the nerves except the phrenic, the pneumogastric, and upper part of the brachial plexus. The lower ends of the sciatic system were most extensively diseased.

The simplest change found was a thinning of the medullary sheath at Ranvier's constrictions, without break in the axis, and without increase of nuclei. The changes in the distal ends of the nerves were very similar, or identical, with what is found in secondary degeneration after section of a nerve. The medullary sheath was divided into fragments of greater or less extent; the axis-cylinder was discontinuous or destroyed, remaining only where the medullary sheath was slightly changed. The fragments of the medullary sheath were finally reduced to very small granular debris, and much of this was absorbed.

In the fibres which were most altered was found an increase of nuclei and apparently small masses of protoplasm,

not nuclei, united and in the midst of the granular débris. Cross-sections of the branches of the sciatics showed almost no nerve fibres with axis-cylinders; the sheath was either filled with granular matter or had collapsed.

In 1883 and 1884 fourteen cases of this kind came under his observation in the City Hospital. There was one child, nine years old, in the list. The oldest patient was fifty-one years of age. More than one half were between twenty and thirty years of age. Their stay in the hospital varied from two days (a fatal case) to six months. In most cases no cause could be given for the disease; in five it was attributed to "catching cold," etc. Of these, with other cases, making nineteen in all, nine occurred in females, and ten in males. There were three deaths.

Disturbance of sensation was one of the most constant and prominent symptoms. Within a comparatively short time the pain becomes severe, and is confined to one nerve district, or may extend to several; sometimes the patient can mark the course of the nerve by the pain.

The character of the pain is aching, shooting, or burning. With the pain there is marked hyperæsthesia, and tenderness of the muscles. After the hyperæsthesia has subsided there is diminution of tactile sensibility and other sensations. The special senses have been only rarely found affected.

Motion is early disturbed; at first stiffness, in part due to pain; later paralysis more or less complete, soon followed by contraction of the limbs which sometimes becomes extreme.

The various tendon reflexes were generally absent. The cutaneous reflexes were less disturbed.

The temperature and pulse were rather elevated in the early stages; in the later the temperature dropped nearly, or quite, to the normal, but the pulse continued rather high:

General wasting of tissues and loss of flesh were prominent symptoms in some cases; in others there was œdema of the limbs and even of the face.

Excessive sweating was observed in some of the patients, and the disease began most frequently in the legs, sometimes confined to them, but often extended to the arms.

The disease is to be diagnosticated from anterior poliomyelitis by the pain and hyperæsthesia, the tenderness over the nerve trunks, etc. Progressive muscular atrophy does not have the sensory disturbances; the electrical changes also are not the same. In lead paralysis also the sensory disturbances are usually less marked and the progress is slower. The disease may be mistaken for rheumatic fever, and when there is œdema of the limbs there may be reason for making such a mistake.

Déjerine has recently reported a case which was supposed to be one of locomotor ataxia. The disease in Japan known as Kak-Ke has been described by Scheube, and in every case, twenty in number, he found neuritis.

Recently Dr. J. B. de Gacerda claims to have discovered the bacillus of beri-beri, which can be cultivated, and when injected produces the disease. The nature of the pathological processes in these cases was generally believed to be inflammation of the nerves, but Erb had made two suggestions: (1) that it is possible, and probable, that purely functional disturbances of the trophic centres in the spinal cord produced anatomical disturbances in the periphery; (2) that it is possible that, besides the complete destruction and separation of the trophic centres, yet other pathological processes occur in them which need not always go so far as to show themselves in total degenerative atrophy of the peripheral regions of these centres.

These suggestions were answered at the same meeting, by reasons which seem to show that Erb's hypotheses were less likely to be correct than that which refers the lesion to the peripheral neuritis, and Erb replies that his hypotheses are met only by hypothesis.

In the case Dr. Webber reported, the degeneration in the peripheral ends was simply the degeneration due to the separation of a nerve from its trophic centre.

Considering the changes found around the annular constrictions, it is reasonable to regard the disease a neuritis not dependent upon changes in the spinal cord.

In most cases the patients recovered more or less completely, but recovery was very slow in severe cases; it re-

quired much time and patience to straighten the contracted limbs, and strength was regained very gradually. Dr. Webber was not sure that any treatment shortened the attack. Morphine was required to alleviate the pain, and it was given hypodermically. Salicylic acid seemed to cut short the pain in some cases.

Remarks on Dr. Webber's Paper.

Dr. ROCKWELL, of New York.—I would ask if in those cases in which prescriptions were made for the relief of the symptoms the actual cautery was used?

Dr. WEBBER.—The actual cautery was not used in any of the cases in the City Hospital.

Dr. ROCKWELL.—I have had, during the last winter, a case of neuritis in which the reaction of degeneration was present, with the burning sensations upon the limbs especially, and I treated it by internal medication and electricity without very marked benefit. Finally, I touched the sensitive spots with the actual cautery, and I suppose I performed that operation a half dozen times within six weeks, with the result of affording very great temporary relief at least. As to its ultimate effect I cannot say. I do not at present see any special difference in the amount of distortion, but the electricity relieves the pain.

Dr. WEBBER.—I have no doubt that the actual cautery would be of great advantage, but I have found blisters more acceptable to the patients, and they have relieved the pain.

Dr. ROCKWELL.—According to my experience, patients have not objected to the use of the actual cautery, especially after the first application.

Dr. WEBBER.—The trouble with me has been to get the patient to submit to the first application.

Dr. BIRDSALL, of New York.—I think that Dr. Webber's paper is a valuable contribution, and has given us a good deal of material in a new line of observation. What was formerly believed to be myelitis has had more attention drawn to it by the few cases which have been published concerning neuritis.

I have been interested with regard to the possibility of

these troubles being due to central lesions, and I am not satisfied that they are not dependent upon central changes. I enunciated that view in the report of a case of lead paralysis, mentioned at the last meeting, in which I found cell changes in the anterior horns of the cord, and ventured to say at that time that I thought it could not be asserted that, because the changes were only found in the peripheral nerves and muscles, the condition was not of central origin. Still, it is a theory which no one can prove at the present time. Dr. Webber's communication is also interesting in the fact that there should have been such a collection of cases, and I think that the relation of the disease to infectious diseases, which has been reported, is interesting, and may suggest further investigation.

Dr. R. W. AMIDON, of New York, presented a left brain which exhibited a softening of the angular gyri and first temporal in "a case of word-deafness and blindness without paralysis." He then gave up his place on the programme to Dr. Roberts Bartholow, of Philadelphia, who read a paper entitled "Note on the Chloride of Gold and Sodium in Some Nervous Affections."

In that curious accumulation of mediæval learning—"The Anatomy of Melancholy"—gold is mentioned as one of the important remedies. From the earliest times gems and precious stones, and to some extent the noble metals, were supposed "to free the mind and mend the manners." Chaucer, who died in the year 1400 A.D., in the prologue to the "Canterbury Tales," describes "a doctour of phisike" who

"Was but esy of dispence :
He kept that he wan in the pestilence,
For gold in phisike is a cordial ;
Therefore he loved gold in special."

The Arabian and Italian physicians, and more recently Chrestien of Montpellier, recognized the value of gold in certain mental and nervous diseases. Hahnemann also investigated its actions and uses, his "provings" agreeing with the published observations.

From the various sources of information now available,

we learn that gold has the property called "alterative" formerly, and now designated by the phrase, "promoting tissue metamorphosis or metabolism"; and it has the power to give stability to nervous matter. The so-called alterant effects, the actions on the nervous system, and the urino-genital properties were the topics treated in the paper.

The preparation preferred for administration is the chloride of gold and sodium—the chloride not being so readily diffusible and manifesting a disposition to clog the kidneys. In small doses it promotes constructive metamorphosis for a time, but in full doses and when administered for a lengthened period increases waste. The tissue yielding most readily being the connective, especially that of pathological formation. Hence its utility in *sclerosis*, whether nervous, hepatic, or renal. Given early and kept up persistently, it has seemed to arrest the progress of posterior spinal sclerosis. In chronic interstitial nephritis it has, in many instances, apparently effected cures.

It has been found very useful in hypochondriasis, especially that form which occurs at the period of degenerative changes in the cerebral vessels. Nervous diseases characterized by spasm, as asthma, laryngismus stridulus, singultus, chorea, etc., have been much benefited in suitable cases.

In sexual debility with hypochondriasis it has been found quite effectual in many instances, and in simple inactivity of the sexual organs has proved to be a valuable excitant. In chronic metritis with dysmenorrhœa the persistent use of gold with sodium chloride has appeared to be an effective remedy.

In these groups of maladies are found the types of cases most suitable for the use of this remedy, but further experiences are necessary. Hence these suggestions are made with the view to awaken inquiry, and to secure more extended observations, on which alone can any durable therapeutical rules be founded.

Remarks on Dr. Bartholow's Paper.

Dr. C. L. DANA, of New York.—I am acquainted with one case, somewhat hysterical, in which the patient suffered

from mental depression, and was treated with homœopathic doses of gold and always with relief. The patient was treated off and on in this way for several years, and gold was the remedy which relieved her. Whether the effect was mental or therapeutical I do not know.

Dr. BANNISTER, of Chicago.—Several months ago I made a number of experiments in the treatment of melancholia by the use of gold, and the results were not definite. But that does not prove any thing concerning the use of chloride of gold and sodium. The treatment was continued for a number of weeks, and the results were not sufficiently beneficial to warrant me in continuing the use of the remedy.

The Association then adjourned, to meet on Friday, at 2:30 P.M.

Friday, third day, afternoon session.

The Association was called to order at 2:30 P. M. by the President.

The minutes of the last session were read and approved.

Present.—Drs. Ott, Birdsall, Amidon, W. A. Hammond, G. M. Hammond, Walton, Mills, Bartholow, Jacoby, Dana, Spitzka, Rockwell, McNutt, Putnam, Shaw.

The SECRETARY called for the report of the committee, consisting of Dr. C. L. Dana and Dr. C. K. Mills, appointed by the President last year to prepare a letter or minute with regard to the death of Dr. George M. Beard.

Dr. MILLS said that he had no report to make, but that the matter had been talked over between himself and Dr. Dana, and the report would probably be made before the close of the meeting.

MISCELLANEOUS BUSINESS.

The Secretary, Dr. AMIDON, introduced the subject-matter of "The William A. Hammond Prize," and asked Dr. Hammond if he would kindly explain to the Association as to whether the prize was still under his control, or whether he had donated it to the Association.

Dr. AMIDON then read the following extract from the proceedings for the year 1882 :

"President HAMMOND said he would very gladly renew his offer of the above-named prize for another year. If, at the end of that time, the prize was not awarded, he would donate it to the Association, or to the New York Neurological Society, with the understanding that it should form the basis of a permanent fund for the promotion of original research."

Dr. HAMMOND said that he adhered to the statement read by the Secretary, and that, as he understood the question, under that statement he had the alternative of giving the prize to either the American Neurological Association or to the New York Neurological Society. Just what he should do with the prize he was unable at present to say. He thought it probable that he might modify the conditions of the prize, as perhaps the conditions were too rigid. His desire was to obtain an original essay on the "Functions of the Thalamus in Man," and that the conditions were too rigid seemed evident from the fact that no essay had yet been offered which met the requirements.

The Secretary acknowledged the receipt of letters of regret from Drs. Schmidt, of New Orleans; Eskridge, of Philadelphia; Weir Mitchell, of Philadelphia; Clevenger, of Chicago; Jewell, of Chicago; and Seguin, of New York.

The Secretary also acknowledged the receipt of four monographs sent to the Association by Dr. Bernhardt, associate member.

He also announced the reception of a communication from E. C. Seguin, nominating Dr. Auguste Forel, of Zurich, Switzerland, for associate membership.

The Association then elected Dr. Danillo associate member.

Dr. E. C. SPITZKA offered as an amendment to the by-laws: "That all business not of a scientific nature shall be transacted in executive session; an executive session shall be held after each regular session."

Dr. W. A. HAMMOND offered the following amendment to the constitution: "Article VI. of the constitution shall be amended by striking out the words 'Third Wednesday in June,' and inserting 'First Wednesday in May.'"

The Society then proceeded with its scientific work.

Remarks on Dr. Wilder's Resolutions.

The SECRETARY read the following resolutions :

Resolved, That there be appointed by the Chair a Committee of five on Macroscopic Encephalic Nomenclature, with instructions to report at the next meeting a list of such terms as, in their judgment, may properly be recommended for use.

Resolved, That, in the opinion of this Association, the advancement and dissemination of an accurate knowledge of the macroscopic anatomy of the brain will be facilitated by substituting for many of the polynomial terms, technical and vernacular, now in use, technical names which are brief and consist each of a single word.

Resolved, That we recognize the advantages of using such monomial compound terms as auliplexus, diatela, mesocœlia, hemiseptum, præcommissura, medipedunculus, postcornu, and cognate, words proposed by Prof. B. G. Wilder, and see no serious objection thereto.

The SECRETARY then moved that the resolution providing for the appointment of a committee of five to report at the next annual meeting be adopted.

The resolution was adopted, and the President appointed as such committee Drs. Wilder, Spitzka, Gray, McBride, and Birdsall.

Dr. DANA moved that the consideration of the other resolutions be postponed until next year.

Dr. BIRDSALL thought it unnecessary to postpone the consideration of the resolutions, as they could be acted upon then as well as at any other time.

Dr. DANA said the resolutions contained specific recommendations, and it seemed to him that it was unnecessary for the Association to act upon them during the present meeting.

The motion to postpone was lost.

Dr. BARTHOLOW moved that the resolutions be referred to the committee just appointed by the President. Carried.

The PRESIDENT called Dr. Birdsall, Vice-President, to the chair, and then proceeded to read his paper entitled, "The Effect of Injuries of the Spinal Cord upon the Excretion of Carbonic Anhydride."

The effect of injuries of the spinal cord upon the excretion of carbonic acid has been, so far as I know, little, if at all, noted. The action of complete division of the cord upon the pulmonary exhalation has been observed in the course of calorimetric experiments by others. That the gray and white matters of the spinal cord have different functions is axiomatic and it is an important question, in what relation they stand to the excretion of carbonic acid. This subject also has relations to the path of the thermo-inhibitory fibres in the spinal cord. The experiments were made with rabbits and cats by means of Woroschiloff's instrument. The apparatus of d'Arsouval was heated to 100° F., the rectal temperature was taken, and the animal placed in a chamber.

The reason of maintaining the calorimeter at so high a temperature was that I wished to see the effect of the partial section of the cord on the rectal temperature. If the ambient temperature should be much lower than that of the animal, then so much heat would be dissipated through the vaso-motor paresis that no rise of rectal temperature would take place. It is known that after complete section of cord, heat-dissipation being prevented, a rise of temperature will be dependent upon that of the surrounding air whether it is above or below that of the animal. Thus if the spinal cord of a rabbit be cut about the junction of the dorsal and lumbar region the temperature falls, but if the animal is placed in a medium where the temperature approaches that of the body of the animal, the temperature of the animal rises. This rise of temperature is due to the division of the cord and not to the external heat.

Thus if an uninjured animal is placed in a warm chamber, for some hours no rise of the bodily temperature takes place, but when the cord is divided and the animal replaced in the warm chamber then the temperature rises. If the spinal canal is opened, completely exposing the cord, without cutting it, and the animal placed in a warm chamber, the temperature rises only a few tenths of a degree. If on the following day the same cord is divided and the animal placed in the warm chamber, the temperature whilst at first falling, rises several degrees.

Prof. H. C. Wood has made six calorimetric experiments during which the cord was completely divided and the amount of carbonic acid noted. The animals experimented upon were dogs, and the cord was divided low down in the cervical and dorsal regions. In his six experiments the carbonic acid was increased, except in two, and in one of these much blood was lost. He has drawn no conclusions about the carbonic acid. In my seven experiments upon partial division of the spinal cord an increase of carbonic acid was noted in all except two. It made no difference in the majority of them whether the white or gray was alone divided. In relation to temperature and partial section of the cord no rise was seen above that observed after the animal had been an hour in the calorimeter, except in two; in the others it fell below normal. The rise of temperature took place where little beyond the spinal gray matter was divided.

Remarks on Dr. Ott's Paper.

Dr. AMIDON asked Dr. Ott what the bulk of the apparatus employed was.

Dr. OTT said it was about eight feet in length by three in width.

Dr. BARTHLOW.—I have no doubt of the accuracy of Dr. Ott's experiments, but it seems to me that there is a general source of fallacy in all similar experiments which is not always heeded, and that is the variation of temperature in rabbits, which is due merely to confinement.

Dr. SPITZKA.—I would ask the President whether the number of respirations was noted.

The PRESIDENT.—They were not. I perhaps should have made the description of the mode of performing the experiment more complete. The temperature of the rabbit was taken and it was noted that it was the same, for one hour previous to the time that it was put into the chamber, that it was during the hour it was in the chamber. So that the temperature of the rabbits always remained unchanged.

Dr. W. A. HAMMOND.—Is it not possible that any injury inflicted upon a rabbit which increases the respiration and action of the heart would increase the excretion of carbonic acid?

The PRESIDENT.—That may be true, but I do not know that this part of the subject has been investigated.

Dr. SPITZKA.—How high up was the division made?

The PRESIDENT.—It was made at the junction of the cervical and dorsal regions.

Dr. HAMMOND.—It is well known that in birds the temperature runs up very rapidly after injury, and I think it is so with reference to rabbits.

The PRESIDENT.—As a matter of fact the rabbit was in the same condition all the time, including an hour before the operation, and there was no difference in the temperature during the whole time.

Dr. BARTHOLOW.—Is it not true that in rabbits placed in confinement, the temperature falls, due to compelled rest, so that the excretions from the body would be so far interfered with that no deductions could be drawn with any degree of certainty?

The PRESIDENT.—The animal in this apparatus is not fixed, although he is in a chamber. But he can turn around and move about to a limited extent. But he is always in the same temperature. Besides, he is under observation for an hour before, and in the apparatus for another hour immediately after section, and under the same conditions as nearly as possible.

Dr. G. L. WALTON, of Boston, then read a paper entitled, "A Contribution to the Study of Hysteria as Bearing on the Question of Oöphorectomy." While we have every reason to congratulate ourselves that we have cut loose from the ancient view that all hysteria owed its origin to a disordered uterus, we can not overlook the fact that there exists a certain number of cases in which the nervous symptoms are secondary to organic pelvic disease, as peritonitis, cellulitis, or cystic degeneration of the ovaries. Certainly, when the hysterical symptoms occurring in persons possessing no hereditary nervous susceptibility, date from the accession of pelvic trouble, and disappear with its relief, the etiological connection between the local and the general disturbance can hardly be doubted. It is to that class of cases distinguished from those in which the local symptoms are secon-

dary to hysteria, that the question of oöphorectomy should be narrowed. In certain cases of hysterical hemianæsthesia and hystero-epilepsy it seems extremely possible that the implication of the ovaries in an organic disease offers the starting-point for the irritation producing an hysterical condition, and in such cases the prospect of relief from operation is not to be neglected when milder measures have failed, and when the symptoms are severe enough to make life a burthen on account of pain.

As to the anatomical connection between the ovaries and the hysterical symptoms, there can be little doubt that the cortical cerebral nerve cells are the chief sufferers in hysteria, and all symptoms, mental, motor, and sensory, are most satisfactorily explained by increased and decreased activity of these nerve cells, and final centres of sensation and motion, and presumably the seat of mental processes. In the majority of cases of hysteria the cerebral difficulty is probably a constitutional one, and the variation of the tenderness, which rarely fails, is merely a local hyperæsthesia, and in such cases no more can be expected from the removal of the ovaries than from the removal of the sensitive spot on the skin or scalp. In cases of hysteria secondary to pelvic disease, as peritonitis, cellulitis, or cystic degeneration of the ovary, the local tenderness is of more serious import and significance. If organic changes have taken place involving the real nervous supply of the ovarian region, it is probable, by the transmission to the brain through the sympathetic nerves of the irritation thus produced, that the hysterical symptoms are brought on.

To Dr. Walton the explanation of hysterical symptoms on the theory of the constriction and relaxation of the blood-vessels, was by far more satisfactory than the dynamic theory, at least in the class of hysterical patients under consideration. This theory by no means limits cerebral disturbance to one side of the brain; nor, on the other hand, does it preclude a limitation of the vaso-motor change to a small part of the cortex—as, for example, to that section in particular, the seat of the emotions or sensations. At the same time it well explains the tendency of the symptoms

to spread over the entire half of the brain and then to the body.

Theoretical considerations with regard to the pathology of hysteria, however, are secondary to the main question: Is hysteria ever set up by ovarian irritation, and, if so, can it ever be relieved by removal of the offending organ? We may safely answer both of the questions in the affirmative, and here the author of the paper quoted Carsten's conclusions (*American Journal of Obstetrics*, March, 1883), who says that "in general I might conclude that Battey's operation is not only justifiable, but really we might say that it is criminal neglect not to perform it in cases which fail to be benefited by other treatment. It is a last resort after every other treatment has failed, in cases which are caused by ovarian disease, such as hystero-epilepsy, dysmenorrhœa due to fibroid tumors, and which either endanger the life of the patient or make her life a burthen to her."

Dr. Walton thought it probable that persistent hysteria might be added to the class of cases already mentioned, the condition being established that the cerebral disturbance is *secondary* to ovarian irritation.

He then cited a case which illustrated the rôle which hysteria may play as an indication for the operation. The patient was twenty-nine years of age, single, and was operated on by Dr. Barss, of Malden, to whom he was indebted for the opportunity to see the patient, and the particulars of which had already been published in the *Boston Medical and Surgical Journal* for June 5, 1884. Dr. Walton gave a detailed account of the symptoms which were present. The operation was performed January 24, 1884. The Fallopian tubes were not removed. Both ovaries, not materially enlarged, were full of small cysts. At the present time, though still complaining of pain in the lower part of the back, the patient eats, sleeps, and feels better, and Dr. Barss had noted sufficient improvement to warrant him in saying the operation was justifiable. The most marked improvement was with regard to the convulsive attacks, previously so severe and frequent, only two slight attacks having appeared since the operation.

Remarks on Dr. Walton's Paper.

Dr. AMIDON moved that the courtesies of the Association be extended to Drs. Emily Blackwell, E. M. Cushier, and M. Putnam Jacobi, and that they be invited to participate in the discussion of Dr. Walton's paper. Carried.

Dr. SPITZKA, of New York, had given serious attention to this subject in connection with a case in which he had opportunity to make a most thorough examination, and he was very far from being as clear in his own mind as the author of the paper had expressed himself concerning the propriety of resorting to this operation. If the theory of vaso-motor paresis, advocated by the author of the paper, be correct, then he could scarcely understand how a radical removal of the cause should not be followed by immediate relief. The amount of improvement, however, which usually follows, is no more than that which sometimes occurs in such patients spontaneously. Certainly the author of the paper could not advocate the extreme view of the connection of general hysteria with disease of the ovaries, and we still are in a position where we can hardly endorse the moderate and limited view which he advances, for the reason that such symptoms occur independent of disease of the ovaries. On the other hand, even in persons of neurotic disposition, extreme disease of the ovaries and appendages occur without any indications for such an operation. It is all very well to base the recommendation upon the theory concerning the essential nature of hysteria, but the fact is we do not know much of any thing about it, and it is just as possible that some of the manifestations may be due to disturbance of the lower tracts and ganglia, as that they have their origin in disturbance of the cortex itself. So far as the theory was concerned, he was inclined to the dynamic rather than to the vaso-motor. The case which he had the opportunity to examine, and to which he had referred, had taught him an important lesson. It was only after a very careful consideration of the case, sustained by the concurrent opinion of a number of eminent medical counsel, that he finally consented to the recommendation that the operation should be performed, because it certainly

seemed that the nervous symptoms depended upon disease of the ovaries. The operation was performed, the disease was found to be much less than was supposed, the patient died five days afterward, and there was no change whatever in the symptoms after the operation.

Dr. Spitzka said he was reminded of one case in which Dr. Israel brought before the clinic in Breslau a patient who had had characteristic hystero-epileptic phenomena, and he said to the gentlemen present: "You see this lady upon whom Battey's operation has been performed, and she has been entirely relieved of her hystero-epileptic symptoms." The patient then left the room, when the professor further stated: "You have seen this patient, and have seen that she has been cured; but I will now say to you that only a superficial incision was made in the parietes of the abdomen, and that the peritoneum was not even touched. A sham operation was performed, and the ovaries are there yet, and the patient is cured."

Dr. C. K. MILLS, of Philadelphia, said his own view of the importance of this operation was that in certainly the vast majority of cases in which it had been performed the trouble might have been relieved by other measures. Thus we all knew, who had had much experience with hysteria and hystero-epilepsy, that conditions as aggravated as those reported in Dr. Walton's case could be removed by measures much less capital than this operation. Then, again, he had had opportunity of seeing, in some cases, failure of the operation to relieve thoroughly the cerebral conditions. A case occurred in Philadelphia not very long ago, or at least came under his observation not long ago, of a woman who suffered from hystero-epilepsy with nymphomania. In her case a prominent female physician removed the clitoris and both ovaries. This patient came to the polyclinic several months after the performance of the operation, and notwithstanding the extent of the operation, she admitted on close questioning that she had many of the same inclinations, and also suffered from nervous symptoms which she had before the operation, although not the same, but in many respects worse.

Dr. Mills thought we should hesitate before recommending an operation of this kind for hysteria. His own view was that hysteria was not only not a disease dependent upon ovarian and uterine conditions generally, but it is seldom specially dependent upon these conditions. At any rate he should hesitate a great while before recommending the operation. In another case in which he was asked to give his opinion, the function of the ovaries had never been established at all, and yet in that instance, as well as in another similar instance, the recommendation had been made that the ovaries be removed. In one case the operation was about to be performed, but for some reason there was hesitation. In similar cases he thought the best thing to be done was to establish the ovarian function in order to relieve the hysterical condition.

Dr. J. J. PUTNAM, of Boston, said he could not share with the speakers' views concerning the theory of hysteria. It did not seem to him to be probable that it arose in vasomotor processes. He thought that the hemianæsthesia of hysteria could not be called unilateral strictly speaking, although he could readily see that there was some reason for giving it that designation. With eye-strain, probably there are cases in which it is one of the causes that act upon a feeble nervous system to produce headaches and other nervous disturbances, and probably in a certain number of cases relieving the eye-strain brings about a transient relief of the symptoms to which it gives rise. So in the same way with reference to disturbance of the nervous system in connection with ovarian irritation. If we get the disturbing influence of an important function, and if the organs which give rise to the function can be removed, and if it can be done with the patient's understanding and full knowledge of the gravity of the operation, in a certain number of cases relief may be afforded, and it must necessarily remain one of the means to be tried, although to be resorted to after all other measures have failed.

Dr. A. D. ROCKWELL, of New York.—This paper seems to offer an opportunity to make a suggestion arising from a long experience at the Woman's Hospital of this city.

There is no doubt that the operation is an important one, and one which, as a rule, is performed as it should be performed, and is performed when it should be performed, in that institution. Still, he was impressed with the fact that there was quite a minority of cases where various symptoms which were attributed to ovarian disease really were not dependent upon that disease. He had quite complete records of all the cases which he had treated in that institution, where many cases of ovarian disease had been sent to him for relief. And he had often found that hysterical symptoms, neuralgic symptoms, and symptoms of disorder of sensation and function were relieved entirely, while the ovarian disease remained unchanged. He knew of one case where it had been recommended by an eminent gynecologist that the ovary be removed, but in which the patient was cured without such operative procedure.

Dr. M. PUTNAM-JACOBI had in mind three or four cases which might be mentioned in connection with that forming the basis of Dr. Walton's paper. One was that of a girl twenty years of age, who when she first saw her was said to be suffering from chloro-anæmia. She had never suffered from dysmenorrhœa, although menstruation had been scanty, and she had a certain amount of pain in the ovarian region associated with no objective local symptoms whatever. Some months afterward she heard that the patient had had a transitory attack of paraplegia, coming on suddenly, lasting twenty-four hours, and then passing away. Two months later a similar attack came on, and the patient suddenly became unable to walk, and this attack persisted, and Dr. Jacobi saw the patient after she had been in this condition a number of months. She was not entirely paralyzed, but was unable to walk steadily. The patient was seen by a number of physicians, and among others by Dr. Thomas, who regarded the paralysis as hysterical and not reflex. Three months afterward Dr. Mundé performed oöphorectomy, and, as Dr. Jacobi understood, the patient was able to walk within six weeks after the operation.

Another case which had fallen under her observation was one in which Dr. Cushier performed the operation, and was

one in which the local objective signs of ovarian disease were marked, while the hysterical symptoms were very much diminished. In this case both ovaries were prolapsed, sensitive to the touch, and the patient had suffered for fifteen years from severe dysmenorrhœa, and premenstrual pain characteristic of ovarian disease. Pain strictly limited to menstruation can not be considered as dependent upon disease of the ovaries, but only when pain precedes menstruation by one or two weeks can it be referred to the ovaries. In this case the ovaries were in a condition of cystic degeneration ; one half of one ovary was transformed into a large cyst.

It seemed to Dr. Jacobi that whenever the ovaries were large and prolapsed, and continued in this condition for one or two years, and the case resisted various methods of treatment employed for reducing the size of the organs and keeping them in position, we might infer that there is cystic degeneration, and from the time that cystic degeneration exists, the ovaries will have to be removed probably, unless, as occurs in a certain number of cases, when a large cyst forms and the organ becomes converted into an indurated tumor, from which the patient suffers but little pain. She had one such case in her record books. As soon as there is proof that the ovaries are cystic, it is simply a question of giving a reasonable amount of time for other remedies to act, and then the question of removing the organ should be considered.

On the other hand, where there are no objective signs of disease of the ovaries, simply pain in the ovarian region, and still some hysterical symptoms, then it seemed to her that we occupied an entirely questionable ground as to whether removal of the ovaries would cure or benefit, or not. Where the ovaries had been removed for tumor of the uterus it certainly had not had any effect at all.

It seemed to her that this question, always a question with regard to hysteria, whether we have to do with symptoms projected from the cortex of the brain, or whether we have to do with local irritation which has its cause in disturbance of the cortex of the brain, was an important one,

and that an immense amount of injustice is done by claiming that pain is imaginary because the patient's attention is distracted from it. If we can find a most singular peripheral sensation which heralds the coming of an epileptic fit, which can be considered as pointing in which region of the brain the epileptic symptom begins, we may probably infer the same thing in these cases of hysteria, in which the source of the disturbance is central and not from the first peripheric.

Dr. WALTON, in closing the discussion, would like to say that there could hardly be any one more conservative than himself upon the question of the operation, except the gentleman who held that it should not be performed at all.

With regard to what Dr. Mills had said, he would simply read a sentence of his paper in which he said: "We can not overlook the fact that there exists a certain number of cases in which nervous symptoms are secondary to organic pelvic disease." It was only in those cases in which he advised the operation. Perhaps later we may add cases in which only functional disturbances are at the bottom of the trouble, although he was extremely conservative with regard to attacking such cases.

The question had been asked: If hysterical symptoms came from the ovaries, why does not removal of the ovaries cause immediate relief. Dr. Walton thought that we have many cases in which secondary disturbance is not removed at once by the removal of the apparent cause,—sometimes it does not disappear at all after the removal of the original cause of irritation, especially when we do not know whether we have done sufficient or not. We may extract a tooth for the relief of a neuralgic pain upon which it is supposed to depend, but the neuralgia may continue, not because the tooth did not produce it, but because the operation had not been properly performed, as, for example, a fragment of the tooth may have been left, or a condition of the jaw remain which was not removed. He thought that one reason why some of the cases had not been cured that might have been cured, was because the Fallopian tubes had been left. Menstruation rarely ceases unless the Fallopian tubes have been removed, but in that respect his case was

an exception. The reason why, in his own case, the patient had not been entirely relieved Dr. Barss had attributed to the fact that the tubes were not removed.

It had also been objected that hysterical symptoms sometimes occur independent of all disease of the ovaries. That is a question to be decided, and that fact sometimes makes the choice of cases more difficult, but it does not show that the operation is not justifiable.

It is said that these patients sometimes get well suddenly, and sometimes they are cured by a false operation. In those cases he held that the diagnosis was false, for it was considered that such symptoms were dependent upon diseased ovaries. If the case has been diagnosed hysterio-epilepsy secondary to ovarian trouble, and a false incision has been made, and sometimes a recovery takes place, the symptoms were not due to actual organic lesion, but such cases were cases of hysteria cured by shock to the nervous system.

It has been said that many cases which have been operated upon could have been relieved without operation. With regard to that I have already stated we should try to relieve the patient without operation, and resort to operation only when other means have failed. We should hesitate long before operating for hysteria alone. Fortunately, we are rarely called upon to operate for hysteria alone, but usually it is the pain which makes the patient's life a burden, and for the relief of which the operation is demanded.

It has also been said that hysteria is seldom dependent upon the uterus, but is generally constitutional. That is the ground which I hold, and, therefore, think there are but few cases in comparison upon which we should operate. It has also been said that hysteria occurs and has been falsely attributed to disease of the ovaries. That is true, but it does not militate against the operation. It simply proves that a mistake in diagnosis has been made, and it does not affect the question whether the operation is justifiable or not.

Dr. JAMES J. PUTNAM, of Boston, then read a paper entitled: "Typical Hysterical Symptoms in Man Due to Injury, and their Medico-Legal significance."

The following case was offered, not on account of its intrinsic interest, but because it was a marked instance of what he believed to be an important, and, perhaps, not uncommon type of disease. The medical expert was rarely called to the witness-stand under more annoying circumstances than when required to testify as to the condition of a patient who claims to be suffering from the depressing results of so-called "concussion of the spine," the result, perhaps, of a slight railroad jar, yet whose symptoms reveal themselves by no outward sign that may not be ascribed to simulation. Under these circumstances any thing of the nature of objective signs of disease is a godsend.

Some of the symptoms of typical hysteria, though not strictly objective, possess almost the same degree of significance on account of the fact that, taken together, they form a picture familiar to the expert, but such that no layman, in the present state of medical knowledge, will possibly imagine.

Dr. Putnam then gave the history of a case which formed the basis of his paper—an instance of railway accident. The patient was jolted forward, then backward, and finally slid down between the seats, striking and scraping his back with some force against the edge of his iron seat, the cushion of which had been displaced.

He gave an account of the symptoms of the case in detail, and finally summarized with the statement that the patient became at first completely paraplegic, then, after some months, hemiplegic, the motions of the right leg remaining absolutely abolished—even those at the hip-joint,—and it was also soon discovered that the loss of sensation had shown the same tendency and concentrated itself upon one-half of the body, and the case assumed in this respect the appearance of a typical hemianæsthesia.

The special senses were all involved in this impairment, and the hearing was diminished for bone-conduction as well as for air-conduction. The emotional irritability and lack of control, although less marked than at first, had also remained to some degree, although hardly enough to justify a diagnosis if the patient were seen now for the first time.

This was the third case of more or less complete hemian-æsthesia in male patients that Dr. Putnam had seen, within a comparatively short time, as the result of concussion, and similar conditions have, of course, frequently been noticed with the other sex, as a result of shocks of various kinds, and it was also well known that a general hysterical state, as well as a variety of marked hysterical symptoms, might make their appearance under like circumstances in men.

A number of cases of this kind have been reported by Page ("Injuries to the Spine"), to whom chiefly belongs the credit of pointing out that Erichsen and his followers are on the wrong tack in seeking to group the symptoms of railway concussion among the signs of spinal disease, instead of referring them to the functional cerebral disorders, where the majority of them unquestionably belong.

The only original observation which his paper sought to establish was that, even when all the prominent symptoms of hysteria, if any were present, have faded away, disorders of sensibility, mainly unilateral, may remain and serve as a welcome guide. It was past belief that a man not previously under the training of a professional expert, should be shrewd enough to assert a set of symptoms which neither court nor jury could comprehend or sympathize with.

Another point of interest was brought out in the course of the trial. In the early period of his sickness the patient had shown an insensibility of the skin of the legs, which quite abruptly ceased at a line passing across the thigh a short distance above the knee, and then running obliquely upward and backward. The question being raised whether this could have been done by design, Dr. Putnam and Dr. Webber made some experiments with regard to this point, and satisfied themselves that to observe such a line with any thing like accuracy was almost, if not entirely, impossible.

Dr. Putnam believed that it was due to the interests of justice and the credit of the profession if the courts should be led to understand clearly that there is a hysteria which deserves something better than to be mated with a smile and a cold shoulder; that it is an affection which has its

own pathology and its own symptoms, and is not a mere mirror of real disease. In the trial upon the case above described this policy was followed and with good effect.

Remarks upon Dr. Putnam's Paper.

Dr. C. L. DANA, of New York.—I have been interested in this paper, because not long ago I was called to see a case belonging to this class. Indeed, I have seen two cases, in one of which I was asked to advise for the patient, and in the other I was asked to advise for the railroad. To begin with Dr. Putnam's last point, I think there is an element in that question which he has not referred to. Hysteria is no doubt a serious disease, and one which the conscientious medical expert should not belittle; but the question arises whether the hysteria is due to the accident, or whether it is developed by the expectation of reward and a constant peculiar mental anxiety concerning some enormous sum of money. The case, which I have had occasion to study rather closely lately, was that of a delicate woman who was on a train during an accident, who was thrown forward from the seat of the car upon the floor. No one else was thrown from their seat, and the accident was not serious. There was no injury except slight contusion upon one leg. After two or three weeks she began to have hysterical attacks, and during this time her husband had put in a claim for thirty thousand dollars damages, which, if received, would make the family wealthy. She developed symptoms of what was called by her physician spinal anæmia, and this went on increasing in severity, and finally she developed bed-ridden hysteria. My opinion was that that woman suffered from hysteria, perhaps starting from the accident, but the expectation of a reward made it worse.

The subject of spinal injuries produced by accidents upon railways is in such a state of confusion, that it is almost impossible to get a lawyer to understand what the position of best experience is. I think it would be well if we could get some authoritative statement, or at least some authoritative statement would be desirable, and some judicial statement would also be highly serviceable concerning

Page's and Erichsen's cases, which are so frequently cited in the courts.

Railroad injuries should be divided into two classes: First, those in which there is a serious injury to the spine of one kind or other, such as contusions, hemorrhages, fractures, etc., and from which the patient suffers immediately, and continues to suffer for a good while and dies. The other class of cases is divided into two kinds: one in which the symptoms gradually, slowly develop, and the patients finally present a picture of chronic meningo-myelitis of the spinal cord; and another class in which is included those which Erichsen regards as spinal concussion, but which should be really regarded as hysteria and hypochondriasis.

I have been unable to find hemianæsthesia in man, as has been referred to by Dr. Putnam.

I think that the electrical resistance may be of some advantage. In the examination of my case the electrical reactions were pretty nearly normal. There was not much objective disturbance. By testing with galvanism I found that the electrical resistance was greater upon the affected side than upon the other side, although there was no difference in sensibility. Some French observer, whose name I do not recall, has shown that electrical resistance is diminished upon the affected side in hysterical paralysis, and it was noticing this statement that prompted me to make the observation, and I demonstrated a marked difference in the electrical resistance between the two limbs, and I think it was pretty well shown.

Dr. PUTNAM, of Boston.—I am very glad that Dr. Dana has studied this subject, and recognized the fact that it is a very important one. All the points which he has made are extremely proper, but I think experts should come to some conclusion, and the entire subject should be reopened from the point of view from which it has been studied. With regard to the slowness of injury, it does not seem to be an element of much consequence, for the patient may be seriously affected, and that before any trial or claim for compensation has entered the mind, and yet apparently be only very slightly injured. In another case where the accident

was not severe, similar symptoms were developed, although no claim whatever for legal damages was made.

The length of time which may elapse after the occurrence of the accident before symptoms develop, I do not think is of much importance, because the effects are sometimes exceedingly delayed. The sensibility, I think, should be tested in all respects, for the hemianæsthesia may be partial. In the first case which I have mentioned, the man was perfectly well, but I found to my surprise that he was able to bear an amount of pain in parts removed from the injury, which rendered it highly probable that he was assuming it.

The question of atrophy is not of much account as, in the last case particularly, and also in one in which I have subsequently made observations, there was a certain amount of flattening of the muscles. A little coldness of the skin—which regularly accompanies such injuries, although it is of no consequence of itself, seems to prove that parts in a state of paralysis must have been active for a long time, and that would be a presumptive basis of argument for simulation, because the patient who simulates would scarcely think of that part constantly, and would be likely to move it somewhat, but very little movement would be necessary to prevent atrophy. With regard to electrical resistance, I do not think that could be of much avail, because the variation depends so much upon the condition of the skin that it could not be made of very much account.

Dr. SARAH J. MCNUTT then read a paper entitled: "Provisional Report of a Case of Double Infantile Spastic Hemiplegia," and presented a brain which showed the lesions.

The patient was a girl of two and a half years—never had walked, never had talked; all of the limbs were smaller than normal, especially upon the left side. They presented the usual contractures of the spastic state. The patient had stridulous respiration with dysphagia and nasal regurgitation of food. The difficult respiration and deglutition with the paralyzes of the extremities dated from birth. The child presented by the feet, the labor was delayed and tedious, and instruments were finally

used. For nine days after birth the child had constantly recurring convulsions. It died of pneumonia.

Upon autopsy atrophy of the ascending frontal convolution, of the ascending parietal convolution, of the paracentral lobule, and of the posterior part of the third frontal convolutions, were found upon both sides of the brain, the condition being most marked upon the right side. A very thin band in the callosum connected the atrophied cortex, and secondary degeneration was present in the pyramidal tracts.

The author cited Henoch, Ross, and Hutchinson's cases. She referred to Benedikt's theory of causation, which regards the spastic hemiplegia of infancy as a systematic affection or a poliomyelitis of the motor cortex, similar in character to the poliomyelitis of the anterior horns in the cord, and she cited a living case of double hemiplegia following measles, in whom she supposed the lesion to have been thus produced. She also referred to the frequency of abnormal presentations and delivery in cases which have infantile hemiplegia without an acute disease, and supposes traumatism at birth to have been in these cases the primary cause; in her own case considering the convulsions to have indicated an extensive meningeal clot.

The author hopes to locate the time of the lesion more definitely upon the completion of the microscopic investigation which is being conducted by Dr. William H. Welch.

The Association then adjourned to meet at 8:30 P.M.

Third day, evening session.

The Association was called to order by Dr. W. R. BIRDSALL, of New York, Vice-President.

Present—Drs. Birdsall, Weber, Amidon, Dana, Gibney, Spitzka, Massey, Rockwell, Walton, McNutt, Jacoby, Putnam.

The minutes of the last meeting were read and approved.

The Council reported favorably on the nomination of Auguste Forel for associate member.

The report was accepted, and the Secretary was instructed to cast the ballot for Dr. Forel.

Dr. DANA from the committee to report resolutions on the death of Dr. Beard reported progress.

Dr. BIRDSALL called Dr. Weber to the chair, and then read a paper on "Ophthalmoplegia Externa Progressiva."

He reported two cases, one from the hospital service of Prof. Roosa, the other from the practice of Dr. Wilson, of Bridgeport, Conn., of slowly progressive paresis of all the external muscles of both eyes (the levator palpebræ, the recti, and obliqui), producing partial ptosis and nearly complete immobility of the eyeballs, with complete preservation of the functions of the internal ocular muscles (iris and ciliary muscles); accomodation being normal, and reaction of the iris to light and accommodative movements also normal; no perceptible lesion of the fundus; vision normal in one case, and defective from irregular astigmatism in the other. No evidence of disease in any other cranial nerve or in any part of the body. No headache and no sign or suspicion of syphilis. The patients were both males, aged respectively seventeen and twenty-nine. Slow improvement occurred: in one case under large doses of potassium iodide; in the other under the same drug, and faradization of the eyes. Both are still under treatment.

Dr. Birdsall held that the lesion could not be due to intra-orbital disease, nor to an intracranial lesion involving primarily the trunks of the nerves implicated, on account of the escape of those branches of the third nerve, which supply the iris and ciliary muscles; that it must therefore be an affection of the nuclei of origin of the sixth, fourth and eighth parts of the third nerve, which supply the external ocular muscles, these parts representing an associated system concerned in movements of the eyeballs, and in lifting the upper lids, somewhat distinct from the iris and ciliary muscles which are more intimately connected with the function of the optic nerve, in the regulation of light, and are probably supplied as far as the sphincter iridis and the ciliary muscles are concerned, from nuclei in close proximity to but distinct from the nuclei of origin of the remaining third nerve fibres, which supply the external ocular muscles. A gross lesion or a focal softening, as a

neoplasm, meningitis or an arteritis, could barely affect so widely separated nuclei as the third, fourth, and sixth, and not at the same time affect the ciliary and pupillary centres, those of the fifth and the seventh nerves, or other neural tracts. Degeneration within this system of associated muscles, nerve tracts and centres, similar to the degeneration of progressive muscular atrophy and of labio-glosso-pharyngeal paralysis, appeared to be the most consistent theory of the pathology of these cases.

Dr. Birdsall stated that Hutchinson, in 1869, had advanced this view, based on an autopsy in which the lesion was found by Dr. Gowers, to account for this class of cases, which Von Graefe first called attention to. In most of Hutchinson's cases, however, the iris and ciliary muscles were affected, and either the conditions or indications of disease in other parts of the nervous system were found in all of his seventeen cases. Reference was made to other allied cases, by other authors; to certain relations between tabes dorsalis and progressive muscular atrophy; also to syphilitic ocular affections.

Remarks on Dr. Birdsall's Paper.

Dr. E. C. SPITZKA, of New York.—In such a rare affection the discussion must necessarily be limited to anatomical and theoretical considerations. There is one difficulty in the way of the explanation of the lesion from analogy offered by bulbar paralysis. The nerve nuclei in bulbar paralysis are not remote from each other, but there is a great distance between the nuclei of the fourth and the sixth pairs. It is of course possible that we have to deal with a particular system, and that a morbid influence could be transmitted even through this great distance by a system of fibres which unite these nuclei.

There is nothing remarkable to my mind in that the ciliary and ocular muscles supplied by the third pair should escape, for the experiments of Hensen and F— show that of the many sub-nuclei into which the third nerve can be anatomically divided, those most anterior are the ones in which these mechanisms have their origin, while the

most posterior nuclei are devoted to muscles affected in Dr. Birdsall's case. So there is topographically a reason why, while all the other muscles suffer, the internal ocular muscle should have escaped.

Dr. BIRDSALL.—The idea expressed has already been advanced by Hutchinson, and I regarded it as Hutchinson did, as a systematic affection, and that these nuclei are affected functionally. The reason why I felt obliged to consider it a pathological process involving these nuclei and associated tracts was, that a greater difficulty came in the moment we attempted to account for it by gross lesion. Of course these cases are exceedingly rare, and we can not judge very much as we have no autopsies of exactly similar cases. Furthermore, it is possible that these cases which I have presented, if allowed to go on by themselves, may develop new symptoms, although the progress of one case is now something over two years.

Dr. BIRDSALL presented Dr. Seguin's statistics with special reference to the efficiency of syphilis in the etiology of tabes dorsalis. They consisted of seventy-two cases, in twenty-two of which there was history of chancre, 30 per cent.; chancre with secondary symptoms in sixteen cases, 22.2 per cent.; a total of 52.2 per cent. There was no history of chancre or secondary symptoms in fourteen cases, 19.4 per cent.; and no mention was made with reference to syphilis in twenty cases, 28 per cent.; total, 47.4 per cent.

There were, then, in seventy-two cases 52 per cent. in which syphilis occurred, and 48 per cent. in which either syphilis was not mentioned, or there was no history of either chancre or secondary symptoms.

Dr. Birdsall continued with his own statistics which he presented at the last meeting of the Association, when he reported that he had collected 525 cases of locomotor ataxia, of which 225 gave a history of syphilis, or 43 per cent.; of his own cases contributed to that number there were forty-two, of which four gave a history of syphilis, or 9.5 per cent.

Dr. Seguin's statistics were based upon cases in private practice, while his own were based upon cases seen in hospital and college clinic practice.

Dr. AMIDON asked the privilege, which was granted, to submit the following statistics which he had received from Dr. Webber, of Boston.

About half the hospital patients were under Dr. Edes' care. The whole number of patients with locomotor ataxia, 62; of these 7 were women. In 37 cases it was distinctly stated whether there had been syphilis: 20 had had syphilis, 54 %; 17 had not had syphilis, 46 %. Of the 62, 33 were hospital, 29 were private, patients. Of 37 cases where record was made in regard to syphilis, 19 were hospital patients, 18 were private. Of the 19 hospital patients, 13 had had syphilis, 68 %, 6 had not had syphilis, 31 %. Of the 18 private, 7 had had syphilis, 38 %, 11 had not had syphilis, 61 %.

In only seven cases, 3 hospital, 4 private, had there been secondary symptoms, at least so far as the patients knew, and in each case the secondary symptoms appeared before the ataxia.

In one case the patient said he had syphilis only two years before the examination, and the ataxic symptoms probably were not so recent, but he acknowledged to having had gonorrhœa ten years previously.

In one case syphilis preceded the ataxia by three years, in one four years, in the others from ten to nineteen years.

In six there was excess of venery, one patient indulging almost daily for fifteen years, another for twelve years, one daily or twice a day for a year preceding the ataxia.

Fifteen of the sixty-two patients are stated to have been exposed to cold or wet, or to both. Several had met with some strain or other injury to the back.

One patient finally died from general paralysis.

Dr. SPITZKA also asked permission to hand in his statistics, of which there were two sets, including a total number of sixty-one patients in both dispensary and private practice. One set included the records of twenty-three or twenty-four private patients which had been under his observation since 1881. The proportion of well established syphilitic cases in the whole number was over eighty per cent. He had one case of well-established cure by antisyphilitic treatment, all

the symptoms completely disappearing, and the patient is now in every respect a well man, the only relic of the disease being asymmetry of the patellar jerk.

Dr. A. D. ROCKWELL had the records of forty-four cases seen in private practice. In seventeen of these the patients had a distinct syphilitic history, or about forty per cent. Six cases occurred in women, and of these two were syphilitic. He should say that of these forty-four cases more than seventeen were syphilitic, because in several of them syphilis was denied at first, and was only found out afterward by very close investigation. His opinion was that syphilis is by far the most important etiological factor, and probably exists in the vast majority of cases of locomotor ataxia.

Dr. PUTNAM, of Boston, said he had sent Dr. Seguin the records of thirty-four cases, in forty-nine per cent. of which syphilis was present. In all the cases in which he had tried antisiphilitic treatment it had been unsuccessful.

Dr. SPITZKA said he did not mean to be understood that the changes in the spinal cord in his case had been removed, but there was no progress in the disease. He would further state that he had succeeded in producing the patellar jerk in two cases which afterward disappeared, and the disease took its regular course, terminating fatally.

Dr. ROCKWELL suggested the possibility of the existence of a peripheral lesion in the case which Dr. Spitzka reported as having been cured.

Dr. SPITZKA could not admit the existence of a peripheral lesion, because it was not conceivable how a peripheral reflex should be associated with the Argyll-Robertson pupil, which he considered as one of the most reliable differential signs of the disease. Of the total sixty-one cases there were two which occurred in women, neither of whom were syphilitic.

Dr. PUTNAM remarked that in his cases there were two women, neither of whom were syphilitic.

Dr. L. WEBER, of New York, quoted his statistics which he had given in a paper read before the New York Academy of Medicine, and published in the *Medical Record* for April

5, 1884. Of the 134 cases of syphilis of which he had kept record during the last twenty years, 118 occurred in men, and sixteen in women. None of them had been less than four years under observation, and most of them from ten to twenty years. Eighteen of the patients had symptoms of specific lesion of the central nervous system, 13.5 per cent.; eight of them of the brain alone, 6 per cent.; five of the brain and spinal cord together, 3.7 per cent.; five of the cord only, 3.7 per cent. Two of the eight cases died of cerebral syphilis, the others were still alive, but not cured. Of tabes he had the record of seventeen cases, and of these syphilis was certainly the principal predisposing cause in three—that is, 18 per cent., and in two more of them it had probably been an important etiological factor.

As to the anti-syphilitic treatment where there had been a quick development of tabetic symptoms, perhaps mostly of the lepto-meninges, an energetic anti-syphilitic treatment would indeed sometimes produce such wonderful results as had been mentioned by Dr. Spitzka, but in the slow cases of tabes occurring in persons from thirty to forty years of age with a distinct syphilitic history he had yet to see the first case where there had been any improvement whatever, so far as the tabetic symptoms were concerned, by the use of anti-syphilitic treatment.

Dr. SPITZKA would like to remind Dr. Weber of a case which he saw with his partner during his (Dr. W.'s) absence, and in which he (Dr. S.) gave an unfavorable prognosis. There was unquestionably a central disease of diffuse character. He had received a report from Dr. Weber subsequently that most wonderful improvement had occurred. He thought there was a great deal, however, in what Dr. Weber said in regard to rapidly and slowly developed cases with reference to the ultimate results to be expected from treatment. In his case the patient presented the phenomena of locomotor ataxia for at least two and a half years, and he did not believe that the case was one in which the lepto-meninges were primarily affected. Indeed the entire chapter of syphilitic meningeal affections is really in the dark at present. Dr. Spitzka had made observations in a somewhat

analogous disease—namely, general paresis of the insane,—and he had at present two cases under treatment. In one, pure symptoms marked its development, and that patient had improved, and probably would be able to attend to his business again. In another case, with slow progressive symptoms, the treatment had been in vain. In this respect his experience in general paresis was like that which he had obtained in the majority of cases of locomotor ataxia, and it was that these cases would go on in spite of the best or worst treatment. So far as his case of locomotor ataxia was concerned, he regarded it as one of the very few unquestionable cures.

Dr. C. L. DANA, of New York, said that Dr. Weber, by his statistics, had suggested another way of looking at the question. Some years ago he made a study of statistics with regard to the number of cases of nervous disease among sailors, and especially with reference to the relation between nervous diseases and syphilis. As he remembered, the proportion of cases of locomotor ataxia in syphilitic patients was as small as one in a thousand. He made his statistics upon the records of the U. S. Marine Hospital Service. Of course, statistics of that kind would be open to much criticism, and the statement might not be worth much, but he was quite sure that not more than one in a thousand of sailors who were syphilitic had ataxia.

Dr. C. L. DANA, of New York, then read a paper entitled, "*Folie du Doute* and Mysophobia."

He referred to the history of *folie du doute*, or the "Doubting Madness," which had been chiefly studied by the French writers. Griesinger and Berger had also described a psychopathic symptom which belonged to the same category, and had called it "Grübel sucht" or metaphysical mania. In *folie du doute* the patient is harassed with a constant desire to question, speculate, and refine over details. His mind is never settled, but is in a condition of "pruritus." It is a psychopathic symptom which indicates that the patient is a monomaniac and truly insane or only hypocondriacal or profoundly neurasthenic and hysterical. It is the form in which primäre Verrücktheit some-

times develops. Mysophobia or fear of contamination is a symptom indicating probably a similar condition.

Folie du doute had been divided by Ball into several varieties, such as the suspicious, the calculating, the timid, and, finally, *tactile*; and mysophobia had been classed as the tactile form of folie du doute. This classification was open to criticism, but Dr. Dana was inclined to think it correct. He related two cases: one a typical one of folie du doute, as described by Falret, Ball, and others; the other one of mysophobia as first described by Hammond.

The first patient was a married man of thirty of a phthisical but not neurotic family history, who had indulged in much sexual excess. He was tormented and worried continually as to the ordinary details of his daily life. He had to wash, shave, eat, drink, exercise, work, etc. in a particular way or he was wretched.

The other was a single woman of twenty-eight, of healthy family history but of hysterical temperament, who for six months had suffered from fear of dirt and contamination, showing the typical symptoms described in cases reported by Hammond, Shaw, Seguin, and Russell.

Dr. DANA suggested as points for discussion: 1. The relation of mysophobia to folie du doute and Grübelsucht; 2. The question of the proper interpretation of morbid fears in general.

Remarks on Dr. Dana's Paper.

Dr. SPITZKA had seen within fourteen months eighteen cases in which were found original monomania and imbecility, and misplaced mental powers for many years. He had also been struck by the fact that heredity plays a slight rôle in this class of cases. He could remember only a single male patient, who was at one time healthy and a great masturbator, and the results of treatment had been gratifying, and one of three cases which he had seen improve. In one of these cases the patient had been advised to study medicine by three of his colleagues of this city. The result was, as might have been expected, that he broke down completely, and has more new material. In one of these cases there was fear of glass. This patient insisted upon having

every particle of food strained through a cloth, and finally came to eat with wooden spoons and other wooden utensils, and her cure dated from the moment when one morning she was about to leave my office I asked her what she had that veil on for, and quickly removed it, and obliged her to go home without it. In the great majority of cases home treatment is almost impossible. Isolation in small country homes is the best treatment possible without attempting to argue or to inflict self-discipline. He thought there was scarcely any one who had not at some period in his life been the subject of imperative conception. He remembered distinctly at one period in his own life when for two days after he had recovered from the effects of morphine necessary to relieve pain incident to a surgical operation that he had an imperative conception in a dream, and the only way in which he could get rid of it was to obtain sleep.

Dr. WEBER, of New York, said he did not see why mysophobia should be raised to the dignity of hypochondriasis. He considered it simply as a symptom of hypochondriasis in the male, and hysteria in the female; in the male with a history of masturbation or sexual excess frequently, and in the female usually associated with some uterine disease at the bottom of hysteria. He could not look upon mysophobia as entitled to the dignity of a special form of hypochondriasis.

Dr. DANA thought that if Dr. Weber had seen one typical case of mysophobia he would admit that it was a distinctly marked trouble, clinically speaking at least, and not to be confounded with ordinary manifestations of hypochondriasis or hysteria. He did not understand that any author makes of mysophobia a separate disease of itself, only mysophobia is a name for a psychopathic symptom indicating that the person is the subject of a particular form of monomania or insanity. The question whether or not it should be called insanity, it seemed to him, was largely a verbal one. He had a case under observation in which the woman worried constantly where things should go, and had been regarded as eccentric, but she could not be called insane; and other

forms were a little worse, and so they increased, and we can hardly say where the patient begins to have abortive monomania,—where you can draw the line and call it insanity.

Dr. PUTNAM, of Boston, was very glad to hear Dr. Dana say that it was not always necessary to remove these patients from home, because if they can be treated without that he should be pleased to hear Dr. Dana give a little more in detail his moral and medicinal treatment, for he had not been able to make the least impression upon any of the patients which he had had. If there were any indications for moral treatment which could be set forth, he thought it would be extremely instructive.

Dr. DANA said he did not think he could give any idea of the measures he took in this particular case. He obtained the patient's confidence in the first place, and persuaded him that he would get comfortable if he would do exactly as he directed him. There were certain habits which he made him cease, etc. The case of mysophobia which he saw was improving when he made his visit, and he advised the using of a little stronger moral efforts than had been used, and he thought the patient would ultimately get comparatively well.

The Secretary then read by title a paper on "Mental Physics," by S. V. Clevenger, M.D., of Chicago; and a paper entitled "Note, with Seven Photographs, on the Impossibility of Mistaking the Auditory for the Trigeminal Region in the Medulla Oblongata of Reptiles," by John J. Mason, M.D., of Newport,—the accompanying illustrations, as shown, demonstrating the point of the paper perfectly.

Dr. G. BETTON MASSEY, of Philadelphia, then read a paper in which he reported "A Case of Sudden Loss of Vision Following Anæsthesia of the Fifth Nerve, with Remarks on the Modifying Effects of Anæsthesia on the Galvanic Reactions of the Special Senses." R. F. A., forty years of age, a farmer, muscular, well developed, and healthy, married three years ago, never drank to excess nor had syphilis, with no history of venereal abuse nor loss of venereal power, was subject to headache, had always used tobacco freely—at times excessively.

Three years ago, while hiving honey bees, he was stung on the left cheek, and was astonished to find that it gave him no pain. From this he noticed that the left side of his face was quite numb. This numbness increased steadily for about two years, and was accompanied by heaviness and pain felt mostly on the left side, though at times extending over the whole head. At the end of two years he noticed that the sight of the left eye was impaired. This rapidly grew worse, and in ten days vision was totally lost, not even light-perception remaining. At this time he came under the care of Dr. William Thomson, from whose notes Dr. Massey condensed the account of his visual condition. Vision of the right eye $\frac{6}{6}$. The left eye blind, and diverges. Both pupils small and immovable. Inspection otherwise normal. Tension normal. No glaucoma. The third pair was not involved. Has adduction when the right eye is closed. The divergence is not due to paralysis of the internal rectus muscle. Ophthalmoscopic examination of the left eye showed white atrophy, the disk being snow-white. Dr. Massey then gave a detailed account of the history of the case as seen one year subsequently, when over the left eye there was found a partially anæsthetic spot, about four centimetres long by three wide. A needle thrust entirely through the skin, although felt by the patient, did not produce pain. The anæsthesia gradually lessened as the periphery of the area was approached. Sensation to the faradic current was lessened. The local galvanic sensations presented a decided deviation from the normal. The sensation of burning was normal. The sensation of tingling was about two thirds lessened. The more distant effects of the current were also about two thirds lessened. Vertigo was readily produced with the poles placed anywhere except in the anæsthetic area, where thirty-five cells were required, while but twelve sufficed for the opposite side of the forehead. No sensations of light could be produced in either eye by the strongest current within the endurance of the patient. Fearing that the remarkable lessening of normal vertigo and taste originally found in the case might be due to the increased resistance as to the

anæsthetic spot, the amount of current actually passing through the circuit was carefully estimated by the deflection of the galvanometric needle. The difference in the results on the two sides could only be explained by placing these phenomena in the already large list of reflex actions, the integrity of one side of the arc in this case being impaired with a corresponding impairment of the phenomena. This solution of the "electric taste" and the "electric flash" was suggested some years ago by Althaus, in his work on electro-therapeutics. The importance of the case here related consists in the clear relation established between the restoration of sensation and the return of the phenomena.

Remarks on Dr. Massey's Paper.

Dr. ROCKWELL, of New York, said that the paper had opened up the question of the effect of electricity upon the special senses. It was a well-known fact that when electricity was passed longitudinally through the brain it caused no dizziness, but when passed transversely it did, and the explanation is in the fact that the brain is unsymmetrically affected, and dizziness is the result. The effect of electricity upon the sensation of taste is remarkable. He had had many cases of loss of taste, many cases where both taste and smell were entirely lost, and it was a singular fact that when taste and smell were lost, the galvanic current would not produce the slightest metallic taste; it is only when this sensibility returns that the sensation of taste returns.

Dr. GEORGE W. JACOBY of New York, then read a paper on "Cerebro-Spinal Saturnism," in which he reported two cases, one of *saturnine paraplegia* and one of *saturnine ataxia*. It was with a decided purpose that he made use of the above title, and did not employ the term which had been recommended by most writers, namely, that of encephalopathy, which had been used to designate spinal symptoms as the result of lead-poisoning. Dr. Jacoby thought he was warranted in concluding that Falk had never seen such cases as formed the basis of his paper. Jaccoud was the first to distinctly oppose the term encephalopathy, which he did in 1867, and in the same paper described a case of saturnine

paraplegia, and other symptoms which might occur as a result of lead-poisoning. Ataxic symptoms were not mentioned. After reviewing the literature of the subject of saturnine ataxia, Dr. Jacoby gave the history of two cases which had been under his observation, and to which he gave the names saturnine paraplegia and saturnine ataxia. In the first case there was no difficulty in making the diagnosis of saturnine paraplegia. The history of preceding forms of lead-poisoning and the development of brain symptoms quite suddenly, together with the spinal ones, both of which occurred without any rise of temperature, together with the extensor paralysis of the hands and the blue discoloration along the gums, made the diagnosis an easy one.

The second case, one of saturnine ataxia, presented greater difficulties of diagnosis. First, because of its rarity; and, second, on account of the patient having had syphilis. The pupils were equal, the temperature and pulse normal; he began to experience difficulty in using his hands, they were clumsy, he had trouble in buttoning his clothes, could not use his knife and fork; finally was in a condition of almost utter helplessness, which became complete when he noticed that his feet were also becoming affected. He did not feel the floor under his feet, he staggered when he walked or stood, ultimately was obliged to remain seated or to crawl around on the hands and knees in order to keep from falling. When Dr. Jacoby saw the patient there was no paralysis or loss of muscular power in the lower extremities, which presented no changes discernible to the eye. The patient could, while lying on his back, freely execute all movements, and develop a normal amount of force. At the same time, there was complete anæsthesia of the entire extremities. When started he could walk, but threw his legs forward, lifted his feet high from the ground and brought them down with the heel first. Entire absence of patellar tendon reflex. The facts that influenced him in making the diagnosis were, first, the symmetrical bilateral paralysis of the extensors of the two middle fingers of each hand; second, the decided spinal symptoms coming on after the cerebral ones; third, the history of the attack and prodromal

symptoms. The fact of the patient not having had any blue lines on the gums, nor any colic, did not invalidate the diagnosis in the least.

If his paper was the means of attracting more general attention to this class of cases, and, through having shown their rarity, he could induce physicians to publish any case that might come under their observation, or might even now be hidden in their case-books, it would have served its purpose.

Remarks on Dr. Jacoby's Paper.

Dr. AMIDON, of New York, remarked that he was unable to see why there could be any more doubt concerning the power of lead to produce ataxia than there was concerning other metals, or poisons, such as arsenic and the diphtheritic poison, both of which were known to produce ataxia and to present symptoms similar to those related in Dr. Jacoby's case.

Dr. JACOBY.—“But is it not strange that these cases have not been reported?” He had not been able to find any reference to them, except two cases in Reynold's system of medicine.

Dr. BIRDSALL said he had observed very marked tremor in cases of lead-poisoning, which even approached the ataxic form; so much so that it was often difficult to distinguish whether or not slight ataxia was not combined with tremor; but he had not seen ataxia confined to the lower extremities in saturnism.

Dr. DANA remarked that it seemed to him we could agree that lead-poisoning was extremely common without ataxia, since within the last ten or twelve years a very large number of cases of lead-paralysis had been reported, and in none of them had mention been made of ataxia. It would seem to him that it would require a great deal of evidence to prove that it was ataxia in Dr. Jacoby's case due to lead-poisoning.

Dr. MASSEY, of Philadelphia, had seen a great many cases of lead-paralysis, but none with ataxic symptoms.

The committee appointed to report a letter or minute on the death of Dr. George M. Beard presented the following report, which was accepted, and the committee was discharged with the thanks of the Association:

The committee to whom was referred the matter of the resolutions regarding the death of Dr. George M. Beard, request that the Secretary record in the minutes of the Society an expression of deep regret on the part of the Society at the loss of a valued fellow-member, and an expression of high appreciation of Dr. Beard's original talents, his persistent industry in scientific work, and his important contributions to neurology and psychology.

C. L. DANA, M.D.

C. K. MILLS, M.D.

Committee.

Dr. AMIDON moved that the Association adjourn, to meet in 1885, subject to the call of the Council with reference to time and place. Carried.

Reviews and Bibliographical Notices.

On the Influence of the Structure of the Nerve Fibres upon the Production and Conduction of Nerve-Force.

By H. D. Schmidt, of New Orleans, La.

Proceedings of the American Association for the Improvement of Science. Salem, 1882.

The well known histologist endeavors in this article to explain the structure of nerves in its relation to conduction. Hermann, who regards the liberated forces during nerve-action as chemical in their nature, gives the following summary of the more recent theories: "In every nervous particle a certain substance splits during its state of activity, and, in consequence of this splitting, the same takes place in the neighboring element; thereby some inhibitory force must be presumed, as the whole store of potential force present is not consumed at once."

The axis-cylinder, which Max Schultze thought to be composed of smooth fibrillæ, Schmidt regards as consisting of fibrillæ, representing rows of minute granules, united to one another by an intermediate substance—in other words, granular fibrillæ. When the axis-cylinder approaches its termination at the periphery, it divides successively into the individual fibrillæ, of which it was originally composed. All double bordered nerve fibres exhibit the segments of Ranvier, and the appearance of segmentation is due to the interruptions in the nerve-medulla, leaving the axis-cylinder, at the points of interruption, only covered by the external sheath. In examining the individual segments it will be found that they themselves are subdivided by a number of deep incisures, observed in the medullary sheath and passing obliquely from the inner surface of the external sheath to the axis-cylinder. These indentations were first observed by Stilling, and are known as the cylindro-conical segments of the medullary sheath. By treatment

with osmic-acid solution Schmidt became convinced that fine fibrillæ form a part of the structure of the medullary sheath, inasmuch as the cylindro-conical segments consist of a number of sub-segments, representing a system of loops. Each sub-segment resembles in form a hollow cone, or a funnel, placed with its narrow end or apex into the base or trumpet-like opening of the following segment, and receiving on the other side its preceding neighbor. While the margins of the bases of the fibrillar funnels are in contact with the inner surface of the external sheath, the margins of their narrow extremities embrace the axis-cylinder. The fibrillar loops of each individual funnel are not arranged in a parallel way, but slightly overlap each other, exhibiting an imbricated arrangement, and are imbedded in the semi-fluid part of the nerve-medulla.

Schmidt comes to the conclusion that the nervous current cannot be strictly compared with that of static or dynamic electricity; neither does this current solely depend for its production upon a particular central apparatus, but is, very probably, also generated in the conducting elements, the nerve fibres themselves. If the fibrillæ of the medullary sheath be arranged in the form of closed systems, the nerve-force, produced by the molecular changes accompanying the process of nutrition, might circulate through these systems in the form of circuits, increasing the main nervous current in strength by way of induction. C. HEITZMANN.

The Pathological Histology of the Spinal Cord. By S. G. WEBBER, M.D. Medical and Surgical Reports of the City Hospital of the City of Boston. Third series. Boston, 1882.

The author dwells first upon the normal histology of the spinal cord, giving credit to the observers, who have advanced our knowledge on this subject, being thoroughly based on the cell-doctrine. The great discrepancy of the views concerning the cells is most striking in the chapters entitled "Other Cells" and "Granular Corpuscles," both of pathological significance. In describing a pathological cavity, confined chiefly to the posterior columns, he says: "The walls were formed of fibres and cells. The fibres were broad and coarse, several times thicker than the normal neuroglia fibres. Near the cavity these fibres were interspersed with cells, forming a narrow and firm lining membrane; externally the fibres were more loosely woven together, with fewer cells and many granular corpuscles," etc. What is the difference, may we ask, between cells and granular corpuscles?

As the result of his careful examinations of inflamed spinal cords, the author sums up the following :

1. *Acute interstitial myelitis*, with swelling of the fibres, nuclei, and cells of the neuroglia, with destruction of the nerve fibres and nerve cells, leading to softening.

2. *Acute parenchymatous myelitis*, where the nerve fibres in the white substance are primarily or chiefly affected, myeline and axis cylinders both disappearing, but the interstitial tissue remaining, seemingly not much changed ; also cases in which the nerve cells are chiefly affected, especially those of the anterior cornua, the nuclei and cells of the neuroglia being almost entirely exempt from change, as in infantile paralysis and allied affections.

3. *Chronic interstitial myelitis*, affecting the neuroglia, fibres, nuclei, and cells in both white and gray substance, the nerve fibres and cells being affected only secondarily, as in sclerosis.

4. *Chronic parenchymatous myelitis*, in the white columns only, locomotor ataxia, or lesion of the posterior columns (and secondary ascending and descending degeneration, possibly), is as yet well known ; lateral sclerosis probably belongs to this variety. In the gray substance the cells are affected as in progressive muscular atrophy. This subdivision of myelitis, taken from the nomenclature of interstitial and parenchymatous nephritis, seems to be well worthy of attention.

C. HEITZMANN.

Contributions to Physiology. By ISAAC OTT, M.D. Part V. Easton, Pa., 1883.

This small volume contains not less than seven original articles, whose titles are as follows : 1. Rattlesnake Venom ; 2. Copper-head Venom ; 3. Vibration of Rattlesnake's Tail ; 4. Vaso-motor, Sudorific, and Sensory Fibres in the Spinal Cord ; 5. Physiological Action of Astragalus Moll. ; 6. Action of Drugs on Plant Growth ; 7. Physiological Action of Convallaria Majalis. Every article gives in a short, spicy way some physiological fact worthy of notice. Most of the articles have previously appeared in this JOURNAL.

C. HEITZMANN.

1. **The Systematic Treatment of Nerve Prostration and Hysteria.** By W. S. PLAYFAIR, M.D. Pp. 111. Philadelphia : Henry C. Lea's Sons, 1883.

2. **Fat and Blood. An Essay on the Treatment of Certain Forms of Neurasthenia and Hysteria.** By S. WIER MITCHELL, M.D. Pp. 162. Third edition. Revised with additions.

Since the publication of the first edition of Dr. Mitchell's work in 1877, his treatment of certain resistant and perplexing cases with rest and excessive feeding, together with isolation, electricity, and massage, has become widely known, and either in its entirety or with some modification has been extensively practised. It has been set forth in a translation 'in French, and has in England found an earnest advocate and upholder in Dr. Playfair, the title of whose pamphlet has been given above. It consists of two articles published in the *Lancet* several years ago, and an address upon the subject delivered before the Medical Section of the British Medical Association at Worcester, August 9, 1882. He indicates Dr. Mitchell's claims for originality in this systematic treatment of nerve prostration and hysteria, and cites a number of cases in his own practice of wonderful cure thereby.

Dr. Mitchell's revised edition gives additional hints to the carrying out of his treatment, answers some adverse criticisms, devotes some space to the treatment of obesity, the use of milk as a diet and its effect on excretions.

It seems strange that Dr. Mitchell should find it necessary to defend his views from adverse criticism. If his method of treatment rescued but one poor creature from the chains of hopeless invalidism it would be worthy of high commendation ; but coming as it does to a class of cases which taxes the ingenuity and patience of the physician to the uttermost, it will be welcomed, as it has been in the past, as one of the measures to try when ordinary methods fail.

GRACE PECKHAM.

Recherches Cliniques et Thérapeutiques sur l'Epilepsie, l'Hystérie, et l'Idiotie. By Drs. BOURNEVILLE, E. BONNAIRE, et WUILLAMIÉ. Paris : A. Delahaye et Lecroisner, 1882.

The present volume is a species of report of Dr. Bourneville's service at the Bicêtre. It contains the improvements devised and desired in his service. It appears that a male nurse committed pæderasty with seven of the idiots ; to three of whom he communicated syphilis. The nurse was sent to state prison with hard labor for twelve years, and was to be obliged to remain for ten years under the surveillance of the police after his discharge. It seems curious that a chronic alcoholic, as this nurse was, should have been appointed to such a position. The second part, "Notes and Observations on Idiocy," contains some interestingly reported cases of "tuberous sclerosis," meningo-encephalitis,

among idiots, together with remarks on microcephaly. A case of hystero-epilepsy in a thirteen-year-old boy is reported. A case of locomotor ataxia, with interesting complications, is here detailed at length. Cases of hemiplegia, idiopathic epilepsy, and epileptic dementia, and the description of an epidemic of measles, are then given. The book is well issued, but its value is not easily settled.

Lectures on Diseases of the Nervous System. Delivered at Guy's Hospital by SAMUEL WILKS, M.D. Second edition. Philadelphia: P. Blakiston, Son, & Co., 1883. Pp. 602, \$6.00.

The basis of Dr. Wilks' work on the diseases of the nervous system, was a series of lectures delivered in 1868 as part of a course on general medicine. These lectures were much amplified, and in the present edition have been changed so as to adapt them as much as possible to the requirements of modern pathology. Dr. Wilks, in his two prefaces, makes explanations which to a great extent disarm criticism. His book is not put forth as a systematic treatise on nervous diseases, but rather as a clinical work for the practical instruction of the physician. It is, as he confesses, faulty in arrangement, and it is now somewhat old-fashioned in its nomenclature, and occasionally incorrect in its pathology—as where he states that in lead paralysis no lesion of the spinal cord has yet been found.

Dr. Wilks makes a plea for a clinical rather than patho-anatomical nomenclature of nervous diseases; and his plea was a strong one fifteen years ago. But this is not the case now.

To those who already have some acquaintance with the pathology of the nervous system, Dr. Wilks' work will be found both interesting and useful. The author gives the results of a wide observation and careful study of nervous diseases. He has the advantage also of writing from the standpoint of a general practitioner, and in these days when it is the fashion to sneer at the narrowness of specialists, we must suppose this to lend particular value to the work. It follows, however, that while we can heartily recommend Dr. Wilks' book to the specialist and even to the general practitioner, it is certainly not a safe guide for the medical student, or the best book for any one to begin with in studying the class of diseases of which it treats.

It is hardly worth while to call attention to the peculiarities and defects upon which we base this opinion. A very superficial reading will reveal the efforts which have been made to twist old

lectures so that they will answer in nomenclature and pathology to the views of the present day. C. L. D.

La Evoluzione Psicologia ai Nostri Tempi. By ERNESTO BONVECCHIATO, Superintendent of the St. Clement Hospital in Venice, Italy. Reprint from *Ateneo Veneto*, Jan.-Feb., 1884.

The present reprint contains an interesting and philosophical discussion of the changes in the views on psychological points as viewed from the evolution standpoint. The author does not unduly deprecate the introspective method.

Editorial Department.

INSANE REFORMERS.

THE influence of local events in tincturing the psychic phenomena of the insane is a matter of frequent observation. Magnan has recently called attention to one phase of it in relation to the question of vivisection. He has had occasion to examine three or four anti-vivisectionists ; all of whom he found to be cases of paranoia (primary monomania). From his published remarks on this subject it would seem that he is inclined to believe that all anti-vivisectionists are insane. This is too extreme a view, and it is as little justifiable as would be the opinion, that because a Recorder of New York City, who (though insane) occupied that position for several years, strongly advocated the policy of hanging all homicides, sane or insane, all who advocate such procedures must be insane ; or, because an eloquent Illinois total-abstinence advocate turned out to be an escaped lunatic from the Indiana Hospital for the Insane, that therefore all total-abstinence advocates are insane. The modern passion for reforming, whether there be abuses or not, tinctures, as do all predominant popular ideas, the mental operations of the insane. The lunatic who, in the twelfth century, would have been a Peter the Hermit or, in the sixteenth, a John of Leyden, becomes, in the nineteenth, an inventor, or more frequently a reformer, who is opposed to the practice of vivisection or vaccination or the use of alcoholic beverages, the abolition of capital punishment, or to any thing capable of being changed.

The lunatic makes an undaunted, pertinacious reformer, who fails to see any thing but his delusion, and, therefore, ignores obstacles. Because of the energy arising from such delusive conceptions, he is often chosen a leader, and it is a sight not without a comical aspect, to see such a lunatic praised for foresight and philanthropy, which are often the offspring of diseased selfishness, and the leader of men intellectually his superiors, who follow him blindly, because his disease makes him energetic. It is a decidedly good sign that the populace are beginning to apply the term "crank" to impracticable projectors, because it denotes a beneficial conservatism which will do much to place the insane reformers where they can do least harm.

THE PENAL CODE AND SUICIDE.

WHEN the provisions of the New York Penal Code became known it was stated by more than one alienist that, although the Code, so far as it related to suicide, was psychologically somewhat well based, it would not be executed with sufficient rigor, as its execution was entrusted to people of rather emotional nature. The following decision shows that this opinion was correct, and that the Code will not accomplish any thing in the way of the prevention of suicide, as its execution will be a mere matter of caprice of, that most capricious of individuals, the police justice: "In the Jefferson Market police court, New York, it was decided that John Alsop, arrested for attempting suicide, should be discharged because, although he was found with his throat cut and a rope about his neck, it had not been proved that he intended to kill himself." It will be obvious that such decisions emasculate the law.

INSECURITY OF ENGLISH ALIENISTS' POSITIONS.

It has become the fashion for English medical journalists to dilate on the insecurity of the position of medical superintendents of hospitals for insane in the United States. Every thing that has been said has certainly been warranted by the circumstances, and no American physician worthy of the name has felt justified

in doing otherwise than fully agreeing with the severe strictures of his English confrères on the evil results of putting medical politicians at the head of hospitals for the insane. This criticism, however, was usually but a text for laudations of English methods in regard to the insane. Late events show that the English live in a very frail glass house in this respect, and will no longer be able to cast stones or congratulate themselves on the perfection of English institutions. Dr. Medlicott was (*Journal of Mental Science*, October, 1882) suddenly dismissed from an English county asylum under circumstances of great and undeserved indignity, and very recently Dr. Wood, (*Journal of Mental Science*, April, 1884,) an able and experienced medical superintendent, was dismissed from his position in the hospital for the insane of that ex-kingdom, the Isle of Man. The circumstances attending the dismissal of Dr. Wood are more disgraceful than even the circumstances attendant on the discharge of every superintendent in the State of Virginia because of the triumph of a political party. The American "politician," not a very enlightened individual, is a decided statesman when compared with the English justices of the peace, who will resist that to which the American bows—public opinion. The members of the "Legislature" of the Isle of Man have in their late proceedings shown themselves not unworthy representatives of the English justices of the peace, whose intellectual powers were the theme of ridicule even in the time of Shakespeare. They have followed a precedent set in the case of Dr. Medlicott, and thereby set a second precedent, which endangers the positions of other superintendents who may chance to show a little more humanity than "visiting justices" deem desirable, because of its cost. It is to be regretted that the Scotch alienists should have unwittingly afforded these inhabitants of the Isle of Man a seeming scientific basis for a very arbitrary action—an action for which the course of the Scotch alienists is indirectly, though unwittingly to them, responsible.

Periscope.

a.—ANATOMY OF THE NERVOUS SYSTEM.

MOVEMENTS OF THE BRAIN.—Luys, in a communication to the Academy of Medicine of Paris, March 25, 1884 (*L'Encéphale*, 1884, No. 4), brought forward a quite new idea, that the brain as a whole changes its position within the cranial cavity, according to different attitudes of the body. When we stand erect the brain is not in contact with the vault of the cranium, as we have been accustomed to believe. When we assume the horizontal position it slides very gently backward, leaving between its anterior surface and the frontal bone a corresponding free space. This space is obliterated when we assume an inverse position, lie with the face downward. In the lateral horizontal posture, the hemisphere placed above presses slightly on the other, and causes a sensible deviation of the falx cerebri, which serves as its bed. The free space is occupied by the cerebro-spinal fluid, which, obeying the laws of gravity, is displaced by the heavier brain substance in different positions of the body. In the vertical position of the cadaver this free space is about 5-6 mm. in depth, though doubtless less during life.¹

These observations were first made accidentally in the cadaver. To prove their correctness, L. subsequently made more careful investigations on the cadaver, and added observations, which have been made, of changes in the prominence of the fontanelles in children, and of parts of the brain where portions of the skull have been lost in the adult, with changes in the position of the body.

Luys then attempts to bring this assumed fact of movement of the brain in relation with certain physiological and pathological manifestations: the momentary vertigo often produced in changing from a horizontal to a vertical position, sea-sickness, pain in movement in cases of meningitis, epileptic attacks at night, etc., etc.

¹ In a communication to the Academy, April 29th, Luys stated that the free space occupied in the normal state by cerebro-spinal fluid may be estimated at one eleventh of the cranial capacity.

In the discussion which followed this communication, Luys' statements were not allowed to pass unchallenged. There was a general dissent from the view that there was a considerable space occupied by fluid between the brain and the skull, and that the brain as a mass was movable within the cranial cavity. The dissent was based partly upon personal observations and experiments, partly on the belief that the data presented by L. were not sufficient to establish his views. But Collin mentioned that he had experimented on the skull of a living horse and observed some movement of the brain, but only in the occipital region, and to a much less extent than noted by Luys; and Sappey stated that, according to his observations, there is usually a space of about 5 mm. in depth, between superior surface of brain and the bone, which is occupied by cerebro-spinal fluid, but this fluid (and therefore the brain) does not alter its position with changed attitudes of the body.

THE NEUROGLIA.—According to Gierke (*Neurologisches Centralblatt*) the neuroglia is not to be classed with the connective tissues, but has a peculiar place of its own in histology. We have to distinguish in it the intercellular substance and the cellular elements, or the unformed and the formed elements. The intercellular substance is especially abundant in the gray matter of the central nervous system, where it makes up about one third of the entire mass; while in the white matter is found principally the formed elements of the neuroglia. The intercellular substance is homogeneous and transparent as glass, similar to coagulated blood serum. The oft-mentioned threads and granules are artificial products. The formed elements consist of cells and their prolongations. Nuclei are found, if at all, only in small numbers, and never in form of granular masses. The prolongations of the cells attain a length of 0.4 mm. There are two kinds of cells: the one is almost filled by the large oval nucleus, the other contains a very minute nucleus. In the white substance of the spinal cord the cells and their prolongations form sheaths around every nerve fibre, while the intercellular substance of the neuroglia is absent. Fibrillary connective tissue is not found in the white substance of the cord.—*Centralblatt für klinische Medizin*, 1884, No. 3.

THE CEREBELLAR CORTEX.—Beevor (*Du Bois-Raymond Archiv.*) gives the following on the histological structure of the cerebellar cortex:

1. The layer of granules. Every Purkinje's cell is in relation with an undivided medullated nerve fibre. Beside the latter there are also other fibres which form a plexus and traverse the layer of granules in every direction, passing on one side into the white substance of the cerebellum, on the other into the molecular layer. These fibres are of very variable size, and anastomose freely

with each other. The first-mentioned fibres pass through the latter without entering into any union with them. In the interspaces of the fibres of this layer are hæmatoxylin cells—which correspond to what were hitherto termed granules (Körner), but which are connective-tissue elements,—and eosin cells, which are connected with nerve-fibres. The hæmatoxylin cells, which are glia cells with nuclei, protoplasm, and anastomosing prolongations, are found also between the nerve fibres of the white matter, and form a supporting medium like that in the white substance of the cord. The eosin cells seem to be only swellings of the axes-cylinders.

2. The molecular layer. The intercellular substance seems to be composed of a fine network. Between the layer of granules and molecular layer, B. describes a *limitans interna*, composed of glia cells which act as a support to the Purkinje's cells, and the nerve fibres and blood-vessels of the latter.

The following is Beevor's schema of the relations of the different parts. Each undividing nerve-fibre is in relation with one Purkinje's cell, its axis passing over into the protoplasm, its medullary sheath into the capsule of the cell. The axis-cylinder divides within the cell into a number of fibrillæ, which again pass into the dividing prolongations of the cells. The fibrillæ run in distinct threads to the periphery. Through the division of the prolongations the fibrillæ at last become isolated. They then bend at an angle of 90° to spread over the surface, and to be again collected into fibres surrounded by medullary sheaths, which, after entering into various plexuses, run into the white matter of the cerebellum.

PHILIP ZENNER, M.D.

b—PHYSIOLOGY OF THE NERVOUS SYSTEM.

THE INFLUENCE OF SECTIONS OF THE SPINAL CORD UPON THE COMPOSITION OF THE BLOOD.—Quinquad has made several experiments upon this subject, and found a diminution of the carbonic acid the nearer the section was toward the cervical region. After a section of the cervico-dorsal segment of the cord he found, at the end of ten to fifteen minutes, that the blood in the femoral veins became arterial, and presented a deep red appearance; the oxygen was increased. Brown-Séquard, in his remarks upon this communication, stated that section of the cord produced two effects at one time: arrest of the changes in all the tissues, which explains the redness of the venous blood; and at another time exaggeration of these changes, or black blood in the arteries.—*Le Progrès Médical*, No. 22, 1884.

CEREBRAL CONVOLUTIONS.—Brown-Séquard stated that since 1870–71 the idea had been advanced that the cerebral convolutions could be divided in two zones: the one, upon being excited,

giving movement; the other zone with a stronger current not giving rise to any motor phenomena. The reverse of this statement should be made, if you excite very vigorously the non-motor zone; inhibition is produced, whilst with a feeble current movement ensues. Thus if a very feeble current is applied upon the occipital lobe there is produced the usual phenomena upon irritation of the motor centres, if the electrodes at the same time are applied upon the motor zone and upon the occipito-sphenoidal lobe, then a true tetanus ensues in place of the ordinary movements. He is able to produce an epileptic attack as a result of cauterization of this zone, which is non-motor. The cauterization of the motor or non-motor parts causes a paralysis of the great sympathetic of the same side. He concludes from these experiments and many others that the non-excitabile parts of the brain possess perhaps an excitability much greater than those which normally have excitability.—*Le Progrès Médical*, No. 20, 1884.

THE DISTURBANCES OF VISION AFTER INJURY TO THE CORTEX OF THE BRAIN.—Mr. Jacques Loeb has made a series of experiments upon dogs, and arrives at the following results:

Every portion of the cortex of the occipital lobes, the median as well as the lateral part of Munk's "centre of vision," the "vision-centre" of Dalton, Ferrier, Luciani, and Tamburini, can be removed without the smallest disturbances of vision ensuing. The view of the authors, that the removal of this spot necessarily leads to disturbances of vision, and the conclusion that this spot is the centre of vision, is erroneous.—*Pflüger's Archiv.*, Band 34, Heft 1 and 2.

THE RAPIDITY OF THE CIRCULATION.—Prof. Robert Meade Smith has made a series of experiments upon this subject. His method of experimenting was as follows: Two pigeons were killed by decapitation immediately before the experiment, and their blood collected in a dry porcelain dish and thoroughly defibrinated by whipping with glass rods; the blood was then filtered through a fine linen cloth moistened with half per cent. salt solution. The animal to be experimented upon was tied, etherized, and glass cannulæ inserted into the external jugular veins—in the left directed toward the heart, and in the right toward the periphery, flow of blood being prevented by spring clips. A cannula was then inserted into the femoral artery and connected with a mercurial manometer writing on the kymographion. The cannula in the right external jugular vein was connected by means of a piece of rubber tubing about four centimetres long with a glass stop-cock, by which the outflow of blood could be regulated to about the amount normally passing through the vein. The apparatus for collecting the blood and for noting the time of each collection consisted of a horizontal glass disc thirty-one centimetres in diameter, which could be uniformly rotated by clock-work at

any desired speed. Twenty four watch-glasses, each about two centimetres in diameter were fastened by sealing-wax around the edge of the disc, and the apparatus was so arranged that as the disc rotated the centre of each watch-glass passed under the stop-cock connected with the right jugular vein. The time was recorded in the following way: The entire disc, with the exception of the border on which the glasses were fastened, was covered with a layer of lampblack and an electro-magnetic lever so arranged that as the disc revolved it would describe a concentric circle on the smoked surface. A syringe containing ten cubic centimetres was then filled with the defibrinated pigeon's blood and bound in the cannula previously filled with the same blood in the left external jugular. After all connections were made the kymographion was started and allowed to revolve for twenty or thirty seconds before making the injection, so as to get a normal pulse and pressure curve. The clip was then removed from the right jugular vein, and as soon as the blood commenced to flow from the glass stop-cock the clip was removed from the left jugular, the injection made and the disc started simultaneously, the instant of starting the disc being also automatically recorded below the pulse line on the kymographion. When all the cups were filled with the blood the disc was stopped and the blood instantly examined microscopically. He arrives at the conclusion that the average time required to complete the circulation in a dog of ten kilogrammes weight was between twenty-five to thirty seconds.—Transactions of the College of Physicians of Philadelphia. Third Series, vol. vii.

ISAAC OTT, M.D.

c.—GENERAL PATHOLOGY OF THE NERVOUS SYSTEM.

DISTRIBUTION OF ANÆSTHESIA IN CASES OF DISEASE OF THE BRANCHES AND OF THE ROOTS OF THE BRACHIAL PLEXUS.—In a most interesting article under the above title, Dr. James Ross (*Brain*, April, 1884) draws the following conclusions from cases reported by Litrevaut, Bernhardt, Wier Mitchell, and others under his own observation, in which one or more of the cutaneous nerves of the brachial plexus has been completely divided, and in which the permanency of paralysis in the region of distribution of the corresponding motor fibres, or some other circumstance had shown that no reunion of the divided ends could have taken place:

1. That one of the principal nerves of the brachial plexus may be divided without giving rise to complete anæsthesia in any part of the area of distribution of the sensory branches of the nerve; and that when complete anæsthesia does occur the portion of the skin affected is very limited, and even the area of skin affected with partial anæsthesia is usually much less than the district corresponding to the anatomical distribution of the nerve.

2. That, as a general rule, the anæsthesia caused by division

of one or more cutaneous nerves tends to become progressively less in degree and extent with lapse of time. From this it follows that in division of one or more cutaneous nerves the area of normal sensibility tends to encroach upon the anæsthetic district so that when one nerve (say the radial) is divided, its area of distribution, as judged by the extent of the anæsthesia, appears to be very small.

3. That the extent, degree, and even localization of the anæsthesia caused by division of any nerve, differ greatly in different cases without our being able to discover anything in the nature of the injury to the nerve or in the external circumstances of the patient which would account for these differences.

4. That the descriptions given by Krause and by Henle of the anatomical distribution of the digital branches, and especially those derived from the median nerve, correspond more accurately with the results of pathological observation than those usually given in English anatomical works.

DESTRUCTION OF OCCIPITAL LOBE ACCOMPANIED BY BLINDNESS.—Case reported by D. J. Hamilton in the *Brain*, April, 1884. Patient, female, aged thirty-six, mill-worker, was under observation at the Edinburgh Royal Infirmary for six weeks previous to her death. Gave history of six months before having had a great sickness and vomiting; vomited matter was undigested food. Sickness lasted a month, then had some headaches. After this said she was subject to fits which did not occur every day. Sometimes had more than one a day. Did not cry out nor bite her tongue, nor have convulsions. During them was unconscious of her surroundings and lost her power of vision. They seemed like faints. All this time she took medicine (iron) prescribed by a medical man. The fits gradually passed away and she had not had one for six weeks. After them she complained of her eyesight which gradually became worse and worse until she was almost blind. When first taken ill pain was in every part of her head, but when admitted to infirmary it was confined to the front of the head between her temples. Had always been troubled with palpitation.

The patient who was not well developed had small but firm muscles. Grasp of hand feeble. Lay in bed motionless with legs usually drawn up. A staring look, pupils widely dilated. Squint outward of right eye. An extremely anxious expression of her face.

Patient could give no account of the origin of her blindness except that it came on rapidly about six months before. There was dimness of vision at first. No diplopia nor color blindness. She was in a very torpid state, and did not answer clearly. Could distinguish light from darkness, but could not count figures. Marked optic neuritis in both eyes, more advanced in the left. Hearing fairly good. No complaints of noises in the head. Taste not acute. Smell almost absent. No difference could be de-

tected between the two sides. Sensation, sensibility, and sense of touch normal. Tickling caused no reflex movements. Organic reflexes normal. Tendon reflexes very slight. Abdominal skin reflexes absent. Mental condition good except for the extreme torpidity, which increased until she died. No elevation of temperature until a few days before her death, when the highest attained was 101.2 F. Upon post-mortem examination nothing of especial note in organs other than lungs and brain. In right lung was small cicatrix with a slight cheesy deposit. Left lung had in upper lobe two cavities: one at apex, size of small orange; the other smaller, near the base, had character of gangrene. Upper cavity had strong gangrenous odor. Edges were infiltrated with solid tissue, apparently cancerous, which also extended into bronchial glands. Microscopically the tumor was composed of large flat cells evidently cancerous in their nature.

The brain weighed three pounds. Skull particularly thin. Surface of hemispheres peculiarly dry, and convolutions flattened. Occupying the occipital lobe in the left side, and entirely confined to it, was a tumor, apparently growing from the dura mater, which was closely and inseparably adherent to it. Optic nerves and tracts did not appear to have undergone marked atrophy. Dura mater easily separated from skull. Both discs were atrophied and the retinae for some distance around them had a yellowish tint.

Tumor size of billiard ball; firm; apparently continuous with brain substance, from which it could not be easily dislodged. Microscope showed large flat cells with the prominent nuclei of epithelium which were arranged sometimes in concentric laminated form about blood-vessels. The latter were numerous, and in many cases distended and tortuous. This tumor was surrounded by a zone of redness which was composed of tortuous and distended capillaries. The tumor had not pushed aside the cortical substance, but had destroyed it completely. The occipital lobe had been replaced by the tumor, which was the only one found in the central nervous system, and was probably secondary to the gangrenous neoplasm of the left lung.

The destruction of the occipital lobe was unaccompanied by distinct evidences of secondary degeneration in the fibres springing from it.

There was, however, enormous enlargement of the side (left) of cerebrum occupied by the tumor, while the other retained its natural size. Enlargement was in frontal and parietal, as well as occipital regions. Corpus collosum thickened on left side and twisted because of the bulk of the hemisphere. Lateral ventricles were also twisted, and left was obliterated in parts because of the protrusion of the tumor.

There was an unnatural toughness of the affected hemisphere. Thalami more congested than normally, as was also right cerebrum, which was otherwise unaltered. The enlargement of cerebrum was caused by increase of connective tissue. Gray matter was unaltered as both sides, or perhaps was slightly diminished. Dense plexuses of processes of Deiter's cells formed enormous

leashes running in all directions, while the nerve fibres themselves remained intact. The left optic nerve showed a tract of degeneration. Right was healthy. Sub-dural and sub-arachnoid spaces of the nerves were unaltered. The corpora quadrigemini, cerebellum, medulla oblongata, and cord showed no lesion. Central canal of cord was nearly obliterated by desquamated epithelium.

THE RELATIONS OF HYSTERIA WITH THE SCROFULOUS AND TUBERCULOUS DIATHESIS.—Professor Grasset makes the following observation :

There is a neuropathic and tubercular heredity. The diathesis is first located in the nervous system, and is then manifested by the hysterical neurosis ; next it invades the respiratory organs, and determines a pulmonary tuberculosis. I look upon hysteria and phthisis as mere successive manifestations of the hereditary diathesis, the symptoms of the one disappearing only upon the invasion of the other. Autopsy has shown that there is true hysteria as well as true phthisis, and not tubercular disease of the nerve-centres giving rise to hysteriform phenomena.

ACUTE ASCENDING PARALYSIS.—Dr. Lamberti Antonini reports in the *Rivista Clinica* a case which he has diagnosticated as "acute ascending paralysis," or the "paralysis of Landry," so called because first described by Landry in 1859.

Dr. Antonini's patient was a woman about fifty-five years, mother of seven children. Previous to the menopause which occurred six years ago, she had had uterine troubles consisting of metrorrhagia, uterine catarrh, and neuralgia. She also had had slight hysterical manifestations, such as the globus and cephalalgia.

One evening in March, when in what she called complete health, she attended the theatre. The next morning, in attempting to arise, she was surprised by a feeling of weakness in both of her lower extremities, which increased notably the second day and was accompanied by fever. This weakness rapidly changed into a paresis, which in turn became complete paralysis. The same succession of symptoms took place in the upper extremities, followed by such a paresis of the muscles of respiration as to endanger the life of the patient. The pulmonary circulation was interfered with, and, in consequence, hypostatic congestion took place, followed by hepatization at the base of both lungs. At the same time the cerebral functions were normal. Sensibility to touch, pain, and heat were normal. No trace of atrophy ; reflex movements intact. Electrical excitability of nerve and muscle normal. Fever of 38° to 39° Centigrade.

The patient recovered first from the paralysis, and afterward from the pulmonary difficulties. She showed no signs of muscular atrophy, when seen a long time after the occurrence of the disease.

The writer regards the case as a perfect picture of the little known and infrequently described disease of acute ascending paralysis, which differs essentially from the acute poliomyelitis of the adult, in which there is vesical paresis. Motor reflexes diminished or abolished, and later muscular atrophy with evidences of electrical degeneration, together with manifest cerebral disturbance. It differs also from the subacute poliomyelitis of Duchenne, which is defined as a paralysis accompanied by complete relaxation of the muscles and loss of their reflex excitability, followed by rapid progressive atrophy, with the reaction of degeneration. In the same way it differs from the incomplete form, the chronic anterior poliomyelitis of Erb.

CHOLESTRUM IN THE SPINAL CORD.—Chiari (*Prager med. Wochenschrift*, 1883, No. 39) found cholestrum in the dorsal spinal cord of a man with ascending and descending degeneration. During life the patient had increasing atrophy, next a spastic condition of the lower extremities, finally anæsthesia of the lower half of the body. In the middle of the dorsal cord was found upon microscopic examination sharply defined atoms of cholestrum, spindle-shaped, having a length of 4 cm., and greatest breadth of 1.5 cm. On account of the perfectly central position of the tumor, within the substance of the cord, here evidently was the starting-point, and not in the meninges. The writer supposes from the microscopic investigation that the cholestrum came from the epithelium of the central canal.

ON SOME REFLEXES OF CHILDHOOD.—By A. Eulenburg (*Neurolog. Centralbl.*, 1882). The author has made an investigation on the tendon, osseous, skin, and pupillary reflexes in childhood, and arranged the results in form of a table. He finds in one hundred and twenty-four infants examined, ranging in age from one month to five years, one hundred and twelve times the phenomena of the knee bilateral; twenty-three times the phenomena of the foot; ten times the tibial reflex of both sides; six times the tibial reflex of one side alone; one hundred and twenty-four times abdominal, nasal, corneal, and pupillary reflexes; one hundred and nineteen times the auricular-reflex.

RUMINATION.—In the *Archives de Neurologie* for May, 1884, is an appendix to the history of Merycismus or Rumination, which has been given in previous numbers of that publication. This peculiar disease is an exceedingly rare one. M. Blanchard estimates the number known to science as thirty-six only. M. Bonchaud cites fourteen, making in all sixteen cases. Thirty-seven of these the writers of the paper, MM. Bonneville and Séglas have tabulated. Of these, thirty-two were males, ten were idiots. The causes of the disease are given as heredity, imitation, voracity, indigestion, and dyspepsia.

A *merycole* usually bolts his food in large quantities, which, after a varying time he regurgitates in small masses, remasticates them, and then swallows them again. Sometimes he can regurgitate his food without any apparent effort, or then again its return to the buccal cavity is caused only by a contraction of the abdominal muscles. M. O. Koerner distinguishes two forms; simple or idiopathic; the other symptomatic and united to dyspeptic troubles. He gives the following characteristics of each:

Merycisme simple occurs after a very full stomach.

Commences half an hour after ingestion of food.

Preservation of the taste of regurgitated food.

Redglutition.

Preservation of flesh.

Merycisme dyspeptique occurs after ingestion of small quantities of food.

Commences almost immediately after ingestion.

Taste acid and disagreeable.

Rejection of the returned aliment.

Wasting.

The writers of the article under consideration criticize the above classification, and say that these distinctions between the two classes are not sufficiently marked to justify it. However that may be, we have cited them here as a list of the symptoms found in this disease. The regurgitation of food takes place, as it has been said, immediately after or some little time after its ingestion; it may continue to be regurgitated for a number of hours. Certain morsels which have been once rolled once sweetly under the tongue can at the will of the individual be brought back to awaken again in the organs of taste the original pleasurable sensations.

Usually the disease, which in itself is not injurious to the individual, continues through life, though sometimes a spontaneous cure takes place.

VERTIGINOUS TROUBLES IN TABES.—By M. Pierre Marie and Dr. G. L. Walton (*Revue de Médecine*).—In a very interesting paper with this title, the writers call attention to the neglect of investigation of auditory difficulties of tabes, which is in striking contrast to the investigations which are almost always made in regard to the eyes.

They instituted twenty-eight observations on tabetic patients in the service of M. Charcot, at Salpêtrière. In seventeen there were found both manifestations of vertigo and noises in the ears. In seven others there was no vertigo. In only two cases there was slight whistling sound, not sufficiently marked to make them worthy of consideration.

The authors came to the following conclusions:

1. Vertigo (*les accidents vertigineux*) is much more frequent in tabes than is generally believed. It is more or less intense and entirely analogous to Ménière's disease.

2. The occurrence of vertigo for the most part coincides with

the commencement of tabes. (In one case it occurred twenty-five, in other cases five, years after.)

3. Its occurrence does not depend upon a degeneration of the auditory nerve, analogous to that of the optic nerve; the physiological function of the nerve is not altered.

4. Its occurrence can be logically attributed to a lesion of certain fibres of the auditory nerve which belong to the semicircular canals, and constitute the nerve for the *sense of space*.

W. R. BIRDSALL.

d.—MENTAL PATHOLOGY.

THE NATURE OF INSANITY.—Dr. J. Hughlings Jackson (*Popular Science Monthly*, June, 1884) says: "Disease is said to cause the symptoms of insanity. I submit that disease only produces negative mental symptoms answering to dissolution, and that all elaborate positive mental symptoms (illusions, hallucinations, delusions, and extravagant conduct) are the outcome of activity of nervous elements untouched by any pathological process—that they arise during activity on the lower level of evolution remaining. The principle may be illustrated in another way without undue recapitulation. Starting this time with health, the assertion is that each person's normal thought and conduct are, or signify, survivals of the fittest states of what we may call the topmost layer of his highest centres, the normal highest level of evolution. Now, suppose that from disease the normal highest level of evolution (the topmost layer) is rendered functionless. This is the dissolution, to which answer the negative symptoms of the patient's insanity. I contend that his positive mental symptoms are still the survival of his fittest states—are survivals on the lower, but then highest, level of evolution. The most absurd mentation and most extravagant actions in insane people are the survival of their fittest states. I say 'fittest' not 'best'; in this connection the evolutionist has nothing to do with good or bad. We need not wonder that an insane man believes in what we call his illusions; they are his perceptions. His illusions, etc., are not caused by disease, but are the outcome of activity of what is left of him (of what disease has spared), of all there then is of him; his illusions, etc., are his mind." There are both truth and error in this statement of Dr. Jackson. That the nervous elements are entirely unaffected pathologically in the production of hallucinations, etc., cannot, strictly speaking, be admitted; that they are not *destructively* involved is true. As was pointed out some years ago (*JOURNAL OF NERVOUS AND MENTAL DISEASE*, January, 1878), in combating the statement of the Utica school of alienists that hallucinations were due to *destruction* of nerve cells and fibres, hallucinations imply an *anatomically intact* receptive mechanism, whose function is temporarily *perverted*. Stripped of evolutionary verbiage, the views of Dr. Hughlings Jackson, expressed in the extract cited, simply amount to the same as the

statement made by hundreds of alienists since the dawn of psychiatry, that delusions, hallucinations, insane conduct, etc., result from inhibitions having been removed by disease. Insanity removes the chains, and the savage in man springs to the surface.

HALLUCINATIONS SIMULATED BY A LUNATIC.—It will be remembered that some of the French alienists have reported cases in which auditory hallucinations were removed by the treatment of aural diseases. A significant commentary on the results obtained in such cases is to be found in the case recently reported by Magnan (*Journal de Médecine et de Chirurgie*, May, 1884). A twenty-three-year-old patient, of unfavorable hereditary antecedents, was attacked in his fifteenth year by an intense otorrhœa; then after an attack of typhoid fever at the age of sixteen he became perverse, errabund, and violent, and after several robberies was placed in an hospital for the insane. Examined by alienists he complained of noises in the ears, and stimulated by leading questions stated that he heard voices on the affected side. He had been considered as a case of hallucinations due to aural lesions, and as such had been presented to several learned societies. His otorrhœa having been somewhat ameliorated by treatment, he soon announced that the voices had begun to disappear; the otorrhœa still persisted, but the hallucinations completely disappeared, and the patient stated that the details he had given were purely imaginary. He ceased to imagine hallucinations when he feared his deception would be detected.

PARETIC DEMENTIA IN A FOURTEEN-YEAR-OLD GIRL.—Leidesdorf (*Centralblatt für Nervenheilkunde*, June 15, 1884) has had under observation a case of paretic dementia in a mentally well developed girl of fourteen, in whom the mental and physical symptoms were well marked, and who died from the marasmus consequent on this psychosis. On autopsy the brain presented pathological characteristic changes of paretic dementia. The case is in many ways exceptional. It is, however, by no means improbable that, under the present system of stimulating emulation at school, such cases will become much less infrequent than they are at present, since children will be subjected to one of the most efficient causes of the psychosis, mental worry, in the most decided manner.

TROPHIC CHANGES ABOUT THE NAILS OF PARETIC DEMENTS.—Dr. Régis (*Gazette Méd. de Paris*, No. 11, 1884) calls attention to the fact that trophic changes in the nails and thereabout, similar to those leading to the fall of the nails and dystrophy found in locomotor ataxia, are sometimes detectable in cases of paretic dementia.

ALCOHOL-CAUSED INSANITY IN SOUTHERN AUSTRIA.—Dr.

Pilkousky (*Wiener Klinik*, November, 1883) states that the statistics of the Lower Austria Hospital for the Insane show that of the patients admitted for the past twelve years 25.3 per cent. of the male cases and 2.7 of the female cases had their insanity caused by alcohol.

BRAIN WEIGHT IN THE INSANE.—Amadei (*La Psichiatria*, I., 1884) has weighed five hundred brains of insane persons, and gives the following table :

Psychosis.	Men.	Women.
	<i>grams.</i>	<i>grams.</i>
Imbecility	1297	1114
Epilepsy	1296	1185
Hysteria	—	1223
Paranoia	1352	1336
Periodical insanity	1418	1254
Mania	1404	1226
Melancholia	1395	1213
Terminal dementia	1333	1114
Alcoholismus	1348	1165
Paretic dementia	1300	1075
Sane people (Tenchini)	1356	1235

RUPTURE OF THE HEART IN THE INSANE.—An interesting comment on the views of Dr. Salemi-Pace is furnished by the cases reported by Dr. A. F. Mickle (*Edinburgh Medical Journal*, February, 1884). The first patient, æt. sixty-six, had been twenty-seven years insane. There was no evidence of cardiac lesion until within a few months of the man's death, when a diffused apex beat and faint cardiac sounds were discovered; the first sound was impure, the second accentuated. He suddenly complained of precordial pain, dyspnœa, and vertigo, and died the next day. On autopsy a discolored spot was found on the left ventricle about two inches long and an inch broad, due to extravasation into the walls of the ventricle, which was so much injured that blood could readily extravasate. The ventricle wall was the seat of degeneration. The second case, a seventy-year-old female, a senile dement, was, while perfectly quiet, suddenly seized by severe precordial pain and died in a few minutes. On autopsy a rupture in the wall of the left ventricle was found. The heart generally was in a state of degeneration. The third case, a seventy-year-old, terminal dement, presented similar cardiac symptoms to the first case, and one morning, on attempting to rise, was seized with precordial pain, and very soon died. An inch-and-a-half long ragged rent was found in the right ventricle. There was cardiac dilatation and fatty degeneration. Dr. Mickle states that these cases present very distinct evidences of how insidiously degenerations of a grave character may progress in the

insane and not produce any special symptoms to attract attention. These cases, in his opinion, show the necessity of the most gentle treatment of the insane with cardiac disease.

ERGOTIN IN PARETIC DEMENTIA.—Girma (*L'Encéphale*, No. 2, 1884) states that ergotin will be found of value at the outset of paretic dementia, particularly in the congestive attacks. Later its effects are chiefly sedative. Dr. Girma seems unacquainted with the fact that the drug has been found of use in the apoplectiform and epileptiform attacks of the disease (*JOURNAL OF NERVOUS AND MENTAL DISEASE*, Oct., 1880). Schüle had long ago shown that ergotin was of value in the congestive attacks of the onset of the disease.

OÖPHORECTOMY AND INSANITY.—Dr. B. F. Dawson (*New York Medical Journal*, June 21, 1884) has reported the case of a thirty-seven-year-old married woman; a multipara whose last labor had been complicated by post-partum hemorrhage. The case had presented symptoms of depression eight years, and had attempted suicide. She had no hallucinations; cried a good deal; would not answer questions, but often complained of pain in the head, breast, and pelvis. Dr. Dawson found ovarian tenderness, and performed oöphorectomy. Recovery from the operation was rapid, and the patient "improved" mentally; she cried less. Dr. Lee, in discussing this case, said that it reminded him of the two cases of supposed insanity described and operated upon by Dr. Robt. Battey. The patients recovered several months after the operation, which was destitute of immediate effects. Dr. Battey ascribed this to the fact that when the nervous system was so long affected as to cause insanity, it required some time to regain its normal state. (It is almost unnecessary to state that on reading this the fact is apparent that Dr. Battey is not an alienist.) Probably some cases bordering on insanity disappeared without operative interference. Dr. W. M. Chamberlain said that to a lady under his care for a long time he had proposed oöphorectomy; the operation was not performed. The patient became suicidal and homicidal, and hospital treatment was necessary. She remained in the hospital six months; was not recorded recovered when discharged, but had since become perfectly well. Dr. W. M. Polk did not think the question could be considered settled. There were many cases of melancholia, complicated by uterine disease, in which the patient got well without uterine treatment. Interference with menstruation was one of the commonest incidents in the psychoses, and seemed to be related to ovarian disturbance when such was not the case. He had a patient with ovarian prolapse and uterine retroversion, who, three years ago, shot herself. She recovered, and is now in perfect mental health, despite the persistence of the uterine and ovarian displacement. These last statements show that there are gynecologists who are not biassed by the doctrinaires who have discussed the relations of gynecology to psychiatry.

SENSE INTER-ASSOCIATION.—A question related to the pathogeny of hallucinations is raised by the cases described by Hilbert (*Klinische Monatsblatt für Augenheilkunde*, Jan., 1884). A twenty-four-year-old woman of healthy family and free from nervous disease had experienced from an excitant to one special sense double sensations. Unpleasant odors and tastes produced sensations of color; in one case, unpleasant beer caused sensations of brown, and in another a sensation of gray. The odor of old cheese caused a sensation of brownish-green; its taste a sensation of yellow. Certain melodies produced sensations of form, and certain sounds sensations of the forms of persons.

COMBINED PSYCHOSES.—Dr. F. Siemens (*Neurologisches Centralblatt*, May 15, 1884) states that there are two great classes of psychoses—the pure and the combined psychoses. This classification is very similar to that of Spitzka in appearance, but it is found that Dr. Siemens is fettered by the conceptions that mania, melancholia, and constitutional insanity (*verrücktheit*) are the only pure types, all the others being these types modified by the existence of degeneration; of developmental changes; of cerebral disease; of cardiac, pulmonary, and renal disease; of acute and chronic infectious disease; by the co-existence of hysteria and the neuroses; by their etiology, etc.; by presence of conditions like pregnancy, the menopause, etc. While the great value of this principle as a point of departure for classification cannot be denied, Dr. Siemens' preconceived ideas about mania, melancholia, and constitutional insanity seriously interfere with the proper use of the same.

THE BLOOD OF THE INSANE.—Seppilli concludes (*Revista Sperimentale di Freniatria*, Anno x Fasc. i and ii) first: That in the early stages of insanity there is frequently noticed a scarcity of the red blood globules as well as of hæmoglobin. Second: The degree of hypoglobulia and scarcity of hæmoglobin varies between very wide limits. Third: These conditions occur more frequently, and to a greater degree, among females than males. Fourth: These conditions are much less frequently noticed in pellagrous than in the other forms of insanity. In melancholia and conditions of depression the lack of globules and hæmoglobin is well marked. In mania the normal condition is present. Fifth: Diminution of hæmoglobin is more frequent in insanity, than scarcity of blood globules. Brancalone has found hypoglobulia in all cases of insanity examined (mania, melancholia, dementia, epilepsy, and parietic dementia).

TEMPERATURE IN THE INSANE.—Tamburini (*Revista Sperimentale di Freniatria*, Anno x) finds that the lowest temperature occurs in epileptics, next in acute mania, next in idiocy, melancholia, pellagrous melancholia, dementia, and stuporous insanity.

AUTOPSY-DIAGNOSIS OF INSANITY.—Dr. John Bowen reports (*Archives of Medicine*, April, 1884) the case of a patient who entered the Kings Co. Hospital for the Insane, calling on the "Mother of God." She refused food and was agitated. The day following admission the patient was noticed to be deeply jaundiced. She died in three days. On autopsy the "vessels of the dura were found to be deeply engorged. The pia was normal, as also was the cerebral substance. The ventricles were full of yellow fluid." Dr. Bowen states that "the autopsy decisively revealed that the deceased was not insane." When it is recollected that in the immense majority of acute cases of insanity lesions of any kind are wanting, the audacity of such an assertion surprises one.

PARETIC DEMENTIA FROM LOCOMOTOR ATAXIA.—Dr. S. V. Clevenger (*Medical Journal and Examiner*, May, 1884) reports the case of a twenty-eight-year-old man who suffered from locomotor ataxia for five years; during the last three of which, delusions of persecution appeared. Latterly, symptoms of paretic dementia developed. The question arises whether the paretic dementia was really due to the extension of the pathological process upward, or to continued irritation of the vaso-motor centres in the medulla. The types of melancholia which result in the course of locomotor ataxia are due to a temporary vaso-motor disturbance, and it is exceedingly probable that the repeated occurrence of these tends to produce that vaso-motor instability which is the essential pathological element of paretic dementia.

PSYCHOSES FROM OPHTHALMIC OPERATIONS.—Dr. Schnabel (*Berichte des Naturwissen. Medic. Vereins in Innsbruck*, Jahrgang xiii.) reports that in twelve cases out of 183 operated on for cataract, psychical symptoms presented themselves. Of these cases ten were men and two women, and were between sixty-six and eighty-three years old. In most cases repetition of the operation (the right and left eyes were alternately operated) caused a reappearance of the psychical disturbance. This began in two cases on the first day after the operation; in four cases, two days after the operation; in two cases, three days after the operation; in two cases, four days after the operation; and in two cases, seven days after the operation. The affection lasted from one to four days, and the symptoms were most marked at night. In the lighter types the patients were restless, slightly irritable, and inclined to run away. The patients in the more decided cases showed mental confusion, did not know where they were, went into strange beds, were obstinate and violent and at times visual and auditory hallucinations were present. The symptoms described are suspiciously like those of senile insanity, and it would seem to be an open question whether the ophthalmic operations had much to do with the matter. It is, however, not impossible that senile tendencies held in check by the patients displayed themselves after the operations.

CRIMINAL HEREDITY.—Dr. U. P. Stair (*Journal of the American Medical Association*, 1884) says. First: That ignorance is not a necessary cause of vice; that the amount of wrong-doing, as a result of ignorance, is infinitely small when compared with that indulged in from a wilful disregard of the moral code. Second: That at the present stage of investigation of cerebral pathology, it is scarcely to be expected that any thing but negative results would follow any serious effort to demonstrate a physical basis for vice in the brain, by the use of the scalpel and microscope. Third: Following upon this, and in perfect harmony with it, observation and experience fail to establish the claim that vice and crime are qualities capable of being transmitted by heredity to any such extent as to constitute a distinct and definite class in human society; and, above all, that there is a *moral* force in the social world, to which, in its sphere, heredity is wholly subservient, which is as positive and potent in its influence as that of gravitation in the physical universe, and he who would teach sociology and ignore the former, is as unsafe a leader to follow as he would be who should attempt to teach physics and ignore the latter. Now when it is recollected that Dr. Stair has had no chance of observing facts for himself, and that he is totally ignorant of the researches of Ferri, Kräpelin, Lebon, Laccasagne, Lombroso, Bruce Thompson, and all who have studied criminality from a clinical standpoint, the audacity of such *a priori* conclusions becomes apparent.

J. G. KIERNAN, M.D.

c.—THERAPEUTICS OF THE NERVOUS SYSTEM.

PARALDEHYDE AS AN HYPNOTIC AND SEDATIVE.—Favorable reports continue to be made as to the value of paraldehyde as an hypnotic. Dr. Th. Benda expresses himself favorably as a result of his experience with it in thirty-four cases, embracing various forms of insanity. Of these cases sleep was produced with doses not exceeding four grammes in twenty-four cases, though in seven cases the effect quietly passed off, and it was found necessary to rapidly increase the dose. The effect on the disease itself was very limited, a beneficial effect being obtained in only a few cases, while one or two seemed to be made worse. Disagreeable symptoms were produced in a few cases. The drug is principally eliminated by the lungs. The appetite in some cases was improved, and in no cases diminished.

The paraldehyde was subcutaneously injected in two cases. The injections caused pain, and in one case profound collapse, and were consequently abandoned. B. concludes that in many cases paraldehyde can be given and with good effect; that it has the advantage over morphia and chloral in being far safer, its ill effects being disagreeable rather than dangerous. It has the disadvantage, in common with other drugs, that the dose must be constantly increased.—*Neurol. Centralbl.*, No. 12, 1884.

Previous experiments with paraldehyde have been made mostly in insane hospitals. Von Noorden has used it in a variety of diseases, including emphysema, bronchitis, phthisis, spinal and other nervous diseases, heart disease, pneumonia, articular rheumatism, etc., and as a result of his observations highly recommends it. He did not notice any ill effects accompanying or following its use. The contra-indications to its employment are severe gastric disease, and advanced phthisis with laryngeal complication. The dose employed varied between three and six grammes. "After every dose, usually given at 8 o'clock P. M., the patient fell asleep in from fifteen to forty-five minutes, generally in half an hour."

Von N. considers there is no danger in giving the drug when the heart is weakened from disease, as it does not affect the pulse-rate or lower the arterial pressure in any appreciable degree.—*Centralblatt für klin. Med.*, No. 12, 1884.

Dr. Kurz (Florence) has also reported the results of his experience in twenty-four cases, and gives a favorable opinion of the value of the drug. His cases embraced a variety of diseases, (including phthisis, cancer, heart-disease, melancholia, etc.), and the sleeplessness, for which the paraldehyde was given, had, in most cases, already existed some time, and resisted other hypnotics. Of these twenty-four cases, slight or no effect was produced in four, and in these four mechanical causes had some influence in two, while in none was a second trial made. Dr. K. concludes that the sleep from paraldehyde is nearest to the natural sleep, and is without after effects. He gives to paraldehyde the first place amongst narcotics.—*Centralbl. für klin. Med.*, No. 18, 1884.

Cervello has found that paraldehyde is antagonistic in its action to strychnia. Animals poisoned with fatal doses of strychnia recover if paraldehyde be given. The latter not only averts death but also the convulsions. The reverse, however, is not true. Animals poisoned with paraldehyde are not saved by strychnia. The antagonistic action of paraldehyde to strychnia is due to its action on the nervous centres. The former lowers, the latter increases the reflex excitability of the nervous centres.—*Centralbl. für klin. Med.*, No. 5, 1884.

THE OPIUM PSYCHONEUROSIS.—Dr. C. H. Hughes, in a paper on the treatment of the opium habit, strongly opposes the sudden withdrawal of the drug. He advises the gradual reduction of the quantity of opium taken by the patient, and the substitution of quinine in doses of double the amount (or the same amount) of opium withdrawn. In the further details of his treatment there is nothing particularly new.—*The Alienist and Neurologist*, 1884, vol. v, p. 123.

ERGOTIN IN GENERAL PARALYSIS.—Girma recommends the methodical use of ergotin for the cerebral congestion occurring in general paralysis. According to G., the dilated capillaries are

contracted, especially in the brain and spinal cord, and consequently the congestion removed, the digestive functions regulated, the constipation relieved, and the apoplectic and epileptic attacks cease. The drug must be used in the early stages of the disease, when the changes in the central organs are not organic, but functional; in the later stages ergotin has still a sedative action.—*L'Encéphale*, 1884, No. 2, p. 160.

STRETCHING OF THE INTERCOSTAL NERVES.—Nerve-stretching seems still to attract considerable attention. A case reported by Dr. L. v. Lissu is unique in many particulars. It is that of a woman, sixty-one years of age, who suffered from intense intercostal neuralgia of both sides, and of seven years' duration. The pain was lancinating, and radiated into the breasts. Both breasts were extremely atrophied, but, nevertheless, out of each a few drops of milk could be squeezed. During the attacks of pain, the milk was increased in quantity. As the neuralgia was located in the seven intercostal nerves, from the fourth to the tenth, and was severest on the right side, it was determined to operate on that side as far back as possible. In the operation, the sixth and tenth nerves were accidentally broken, and excised. From time to time after the operation the patient complained of slight dragging pains in the right side, and a feeling of compression in the region of the lower intercostal nerves. On the eleventh day the patient was discharged, and was not again heard from, excepting that some time afterward she died.

The case is incomplete from absence of knowledge as to whether the pain returned; but it is interesting from the age of the patient, the large number of nerves involved and stretched, the rare occurrence of secretion of milk in connection with intercostal neuralgia, and the increase of the milk during the attacks of pain.

The writer gives directions for the best method of performing the operation, and lays stress upon the fact that the nerves are not to be found directly under the lower edge of the ribs, as commonly described, but above and behind, so that the ribs must be raised to bring them into view.—*Deutsche Med. Wochens.*, No. 20, 1884.

STRETCHING OF THE FACIAL NERVE.—Two cases are reported by L. C. Gray. The first was that of a man thirty-six years old who had suffered for twenty years from tic-douloureux in the second branch of the right trigeminus, accompanied by spasms of the lower jaw muscles. The pain returned four days after the operation, but the spasms were diminished. There resulted facial paralysis, with the reaction of degeneration.

In the second case, that of a man twenty-two years old, who had suffered for ten years from choreiform movements of both sides of face and of both hands, the left facial was stretched, with the result of a cessation of the symptoms for two months, when

they returned.—*The Amer. Jour. of Neurol. and Psychol.*, 1883, vol. i., p. 575.

(The results, accordingly, were the same as are usually obtained after this operation in *tic convulsivæ*. In a table of thirteen such cases collected by Mr. R. J. Godlee, in all but one the relief was only temporary.)

STRETCHING COMBINED WITH RESECTION OF THE SPINAL ACCESSORY FOR SPASMODIC TORTICOLLIS.—Dr. Schwartz reports the case of a woman, twenty-six years old, who had suffered for two years from spasmodic torticollis. All other means having failed, Dr. S. resorted to stretching and resection of the spinal accessory. After a transitory paresis, there remained only a slight deviation of the head, painless, and easily corrected by an apparatus.

Dr. Schwartz gave a résumé of eight other cases of torticollis treated by section, resection, or stretching of the spinal accessory.

Section or resection in five cases gave two cures and three improvements.

Stretching alone in two cases resulted in one cure and one failure. Resection combined with stretching resulted in one cure, and, in the case reported, one improved. He concluded that resection afforded the best chances of success, but thought it could be combined with stretching with advantage.—*Rev. de Chirurgie*, May, 1884.

SUBCUTANEOUS NERVE-STRETCHING.—Not only the efficacy of nerve-stretching, but that it is not necessary to resort to extreme force, seems to be shown by the results obtained in eleven cases reported by Drs. V. Corval and Wunderlich. As the circumstances were such that chloroform could not be given, moderate force only could be used on account of the pain, but the operation was repeated every second or third day. The eleven cases included, sciatica, 4; tabes, 4; cervico-occipital neuralgia, 1; muscular spasm (leg), 1; spastic spinal paralysis, 1. Of these all but two (one of sciatica and one of tabes) were either improved or cured. In the cases of tabes the analgesia present allowed the leg to be so strongly flexed that the foot touched the face.—*Deutsche Med. Wochenschr.*, No. 20, 1884.

VERATRIA IN MUSCULAR TREMOR.—After small doses of veratria each muscle when stimulated reacts more vigorously, and the contraction lasts longer than in the normal condition. The increased duration of the single contraction is shown not only by the greater length of the myographic curve, but also by the fact that while thirty stimuli per second are needed to set a normal frog's muscles into tetanus, some ten suffice to tetanize the veratrized muscle. The tremors of alcoholism, of central nerve degeneration, of fever, etc., are due, according to Dr. Feris (*Société*

de Biologie, No. 26, 1883), to a condition of muscular contraction in which the impulses are not sufficiently rapid to give rise to tetanus. This may be owing to defective innervation, as well as to muscular degeneration. Dr. Feris has used veratria in such tremors, giving it in pills of half a milligramme each ($\frac{1}{120}$ grain), of which four were taken daily at intervals of an hour. Of thirteen patients so treated ten were suffering from alcoholism, two from disseminated sclerosis, four from sequelæ of typhoid. In all the tremors disappeared entirely from five to fifteen days. Improvement appears after the first day, as is shown by making the patient write before and (one hour) after each pill. The treatment should be kept up for ten days at least or relapse may occur. The cases have continued well for two months at least after the veratria was stopped.—*The Practitioner*, March, 1884. (In one case of paralysis agitans treated by the reporter with veratria, no improvement could be detected.)

THE REMOVAL OF THE OVARIES FOR HYSTERIA.—Dr. Walton reports a case of hysteria which was greatly benefited by the removal of the ovaries. The patient was an unmarried woman, twenty-nine years of age, who suffered from excessively painful menstruation, convulsive attacks, hemianæsthesia, tenderness in ovarian region, exaggerated tendon-reflex, rigidity of legs, etc. Dr. Barss, under whose care the patient was, removed both ovaries, which were found to be degenerated (cystic). Marked improvement followed the operation, and persisted at time of Dr. Walton's last examination, two months later. Dr. W. advocates the removal of the ovaries in suitable cases. At the meeting of the Society (clinical section of the Suffolk District) before which this paper was read, Dr. John Homans reported three other cases in which he removed the ovaries. All made good recoveries from the operation, and two were cured of their symptoms, no relapse at the time of the report having occurred. The third case was not benefited.—*Boston Med. and Surg. Jour.*, vol. cx., No. 23.

METALLOTHERAPY.—Drs. Burq and Moricourt report the following case of a young woman, twenty years old, who had been an epileptic since infancy, and had suffered for fifteen years from ovarian neuralgia and for eight years from hyperalgesia of the breast. The least touch in these two regions caused most intense pain. The whole remainder of the body, excepting the outer aspect of the left leg, was absolutely anæsthetic. The special senses were affected in a less degree, and the muscular power was diminished. Bromide, static electricity, and baths were in turn used without benefit. Finally, it having been found that the patient was sensitive to silver and aluminium, she was treated internally and externally with the former; sensation having been restored by means of aluminium placed on the left forearm, the patient was requested to place a plate of silver above the left

breast. After some hesitation and with considerable trepidation she did so, and found to her astonishment that she could not only bear it, but could press firmly without causing more than slight pain, which in a few moments also disappeared. Similar effects followed the application of silver discs to the ovarian region and below the breast. Ten days later there was a return of hyperæsthesia but in different situations. At the end of a week this again disappeared under the same treatment. Five weeks later the patient reported herself free from pain, though the epileptic attacks continued. The writers also relate another case in the service of Dujardin-Beaumetz, which they claim shows the influence of metallothérapie. A woman, forty-one years old, suffered from impairment of general and special sensibility, paraplegia, hypermetropia, lumbar pain, etc. Having been found sensitive to gold and copper, she was given the former internally by hypodermic injection and the latter was applied externally. She greatly improved, though apparently at the time of writing not yet well.—*Gazette des Hôpitaux*, No. 56, 1884.

EPILEPSY TREATED WITH HYDROBROMATE OF CONIA.—R. Norris Wolfenden has experimented with this drug in seven cases of epilepsy with not particularly brilliant results. Three of the cases, possibly four (?), seem to have been improved, though the time they were under treatment was short, and in most cases he was obliged to return to bromide on account of disagreeable symptoms produced.

The conclusions he draws are that the drug is undoubtedly serviceable in certain cases, and those in which it fails are cases of convulsions depending possibly on some lesion of the brain.

The drawbacks to the use of the drug appear in the complaints of headache, and, when given in large doses, of giddiness lasting half an hour after taking it, with sometimes a suffusion and congestion of the conjunctiva. He thinks the drug deserves further trial.—*The Practitioner*, June 1884.

D. MORTON PRINCE, M.D.

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MORAL INSANITY—WHAT IS IT?

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"There have been men who, after an illness in which life itself seemed suspended, have arisen, as out of a sleep, with characters wholly changed. Before gentle, good, and truthful, they now become bitter, malignant, and false. To those whom they before loved, they evince repugnance and loathing. Sometimes this change is so marked and irrational that their kindred ascribe it to madness. Not the madness which affects them in the ordinary business of life, but that which turns into harshness and discord the moral harmony which results from natures whole and complete. But there are dervises who hold that in that illness which had for a time the likeness of death, the soul itself passed away, and an evil genius fixed itself in body and brain thus left void of their former tenant, and animates them in the unaccountable change from the past to the present existence."—BULWER, "A Strange Story."

BULWER, albeit not an alienist, has in this extract very graphically described the opposing views held of moral insanity even at the present time.

The doctrine of moral insanity, as expounded by the alienists who accept that doctrine, was a natural outgrowth from a school of psychology which, first systematized in the theology of St. Augustine, found a later expression in the theology of Wickliffe and Calvin. In this theology the present writer was educated, as it had been followed by his maternal ancestors for more than two centuries. This school gave a theological explanation of certain facts which to-day require no *deus ex machinâ* to account for their existence. The present writer was accustomed to hear of children bad

from birth, whom no system of education could change, and no discipline tame. For the sins of their fathers they were predestined criminals. In the same category were placed children whose natures had changed, as described by Bulwer.

It was from a belief that such facts could be explained only on the supernatural theory that Dr. Ordronaux¹ was led to use the following language: "Lastly, we object to 'moral insanity,' because it is an attempt to set back the clock of the century and to revert to supernaturalism and superstition in medicine. It is an attempt to curtain the windows of that science whose duty it is to cast light and not mysticism around disease,—to treat it not as a personal devil entirely to be exorcised by *philters* and mummery, but rather as the perversion of a natural state struggling to regain its equilibrium."

Dr. Ordronaux could see in the doctrine of moral insanity only an attempt at a semi-return to the belief in demon-possession of the middle ages. He confounded the supernatural explanation of the facts with the facts themselves, and used the "superstition" argument against the existence of these facts, just as Leibnitz used this argument in accusing Newton of having introduced "miracles" into philosophy in advancing the theory of gravitation. The same superstition argument was used against the determinism of St. Augustine, Wickliffe, and Calvin.

It is not strange, therefore, that since nowadays the determinist is considered, as from necessity, a materialist, and the doctrine of free will is held as almost a *sine quâ non* for an orthodox believer, the doctrine of moral insanity should be regarded by Dr. Elwell² as given forth by "a class of modern German pagans, who are trying with what help they can get in America to break down all the safeguards of our Christian civilization, by destroying, if possible, all grounds for human responsibility."

To Ordronaux and his school of thinkers, moral insanity seemed like "an attempt to introduce miracles into philosophy."¹ It was inconceivable to Dr. Ordronaux, because the moral nature was associated in his mind with innate ideas, and he belonged to the school of Locke, which denied that any idea could be innate. In Dr. Ordronaux's opinion the doctrine of moral insanity had no relation to the school of Condillac, which based all ideas on sensations, but was opposed by the teachings of that school.

The school of objectors to this doctrine, which has arisen since Dr. Ordronaux wrote, is represented by Dr. Elwell and Dr. Hay (the latter of whom is cited not because of the intrinsic value of his article, but only as a representative of this new school). Dr. Hay³ says: "Nothing is absolutely evil, and, whatever be the object of one's desires, it becomes such by reason of some good to the one desiring it. For in a normal condition no one seeks that which is evil to himself, since that which is evil occasions the feeling of pain, and this induces aversion. Hence one who seeks evil does so either by reason of defect in his perceptive faculties, whereby he apprehends objects incorrectly, or by an effort of will diverting his actions toward an object or aim from which in the natural order they would have been averted. It follows therefore necessarily, if the foregoing propositions be correct, that the assumption, that out of perfectly normal perceptions feelings or sentiments discordant therewith could arise, giving origin to abnormal desires impelling to vicious actions, is erroneous, and any theory or doctrine based upon such assumption is untenable. This philosophical error, that 'all mental action originates in feeling,' is the source and origin of the modern theory of 'moral insanity.' For although not explicitly formulated by the originator and earlier exponents of the doctrine, this false principle is explicitly involved in every expression of it.

The theory is termed modern, since it had its origin in the conclusions of Philip Pinel, drawn from his clinical observations at le Bicêtre and la Salpêtrière in Paris during the close of the last and the beginning of the present century. Under the appellations *Manie sans délire* and *folie raisonnante* he (as quoted by Esquirol) designated certain forms of mental disease marked by perversion of the habits, dispositions, and affections without lesion of the understanding. Esquirol, Pinel's pupil, physician of la Salpêtrière and Charonton, while explicitly accepting the conclusions of Pinel, implicitly refutes them. One need not go far to find the source of Pinel's ideas in the philosophical assumptions of Condillac, as developed in his *Essai sur l'origine de connaissance*, in which he asserts that all mental energies are but modifications of sensation, which is primary. It would be no difficult task to rearrange the cases cited by these two great masters in medicine to illustrate the doctrine of 'reasoning madness' into two new categories, *i. e.*, of delusional insanity and wilful vice. In many of these reported cases the evidence pointing to the existence of delusions in the minds of the subject is so clear and conclusive that its escape from detection is remarkable, but explicable, perhaps, by the fact that great philanthropists are not always great philosophers, and in their zeal for the welfare of a class they sometimes overlook the higher obligation, 'to promote the greatest good to the greatest number.' To the condition designated by Pinel as 'reasoning madness,' and by Esquirol as 'reasoning monomania,' Dr. Prichard, in England, applied the epithet 'moral insanity.' "

Nothing need be said of the misconception of Pinel and Esquirol displayed in this passage, nor of that "appeal to consequences," unworthy of any scientific man, which seems absolutely necessary to the argument of every opponent of the doctrine of moral insanity.

The question arises as to what Dr. Hay means by feeling, and to understand his meaning it is necessary to examine some of his psychological dogmas. He says respecting idiocy: "Now, the idiot is such not by reason of any deficiency primarily in his reasoning faculties or faculties of comparison. For since these have never been exercised, a judgment concerning them is impossible, but in consequence of a deficiency in his perceptive capacities, whereby he fails to receive impressions upon his brain which should constitute the material out of which judgments could be formed and about which reason might be exercised. In many examples of this class of unfortunates, deficiency of perception is quite apparent by reason of conspicuous defect in the organs of special sensation, and the subject is often perceived feebly endeavoring to supplement the deficiencies of one sense by the application of another, as for example to comprehend through the sense of touch, or taste, or smell, conditions ordinarily appreciable by that of sight, and reciprocally. The true nature of this condition has been implicitly recognized in the system of education of idiots, now well established and in successful operation in this country and in Europe. This system consists in the education of the perceptive faculties, and has for its basis progressive series of object-lessons. What has been said of the defective perception of idiots applies with equal force to the class somewhat higher in the scale of intelligence termed imbecile, or, more commonly, weak-minded, although the evidence is not so obvious to the ordinary observer. Close scrutiny of the mental operations of the weak-minded will reveal the fact that their imperfect reasoning results from original defective perception. Many, indeed most, of this class are incapable of abstract thought; their perceptions are superficial, incomplete, imperfect, comprehending but few of the attributes of objects, and their judgments, if they

can be said to form any, necessarily unequal and narrow ; their opinions crude, their reasoning vague and inconclusive. One who should carefully analyze the attempts at reasoning by some of this class, will perceive that the failure to arrive at correct conclusions results from incompleteness of original observation ; the individual sees, as we say metaphorically, but one side of any thing, and his mind responds at once to this simple impression. The mental processes of this class are analogous to the actions of the spinal cord, uncontrolled by the influence of the brain, which responds, by its reflex irritability, to sensory impressions in spasmodic, incoördinate muscular movements without definite aim or purpose."

He says respecting sensation : " In the physiological order sensation is the reflex of an impression upon the receptive capacities, without which impression it could have no existence ; so also in the psychological order is feeling or sentiment the reflex of an impression from without upon the receptive faculties. For whether the feeling or sentiment is generated by an impression made *de novo* immediately upon the receptive capacities or recalled mediately into consciousness through the operation of the reproductive faculty, it must have its source and origin, its object, outside of the self. Hence, there can be no feeling or sentiment without an original object from which the impression was received, of which impression the feeling was the reflex and incidental effect. How can one feel without knowing that he feels ? For a feeling which is outside of the cognition of a sentient being has no existence, is a non-entity. Now, the act of knowing necessarily presumes the capacity to know, and the subject knowing, and also the exercise of that capacity by the subject. Hence, the assumption that ' all mental action originates in feeling ' is erroneous."

Comparison of these statements with the remarks on

idiocy will show that Dr. Hay has either totally misunderstood Condillac or else has sophistically misconstrued his opinions. Dr. Hay says : " Now, the only channels through which evidence can reach the mind primarily, are the perceptive faculties ; if these faculties be in a healthy condition, impressions received through them would be correct, and their comparison would result in correct conclusions, and there would be no delusion. Delusions, whenever it is possible to trace them to their source, will be found to rest upon hallucinations, false sense-perceptions without objective bases, residua of former impressions recalled into the sphere of consciousness by the operation of some disturbing force. The true criterion of insanity is the retention by the mind of a false conclusion insusceptible of removal by sufficient evidence, constituting an insane delusion. Rigid exhaustive analysis of every case of insanity will detect this element as the prime factor."

It is unnecessary to state that no alienist clinician will agree with these views, although they are so sophistically expressed as to be seemingly reconcilable with any state of things.

A psychologist entering upon this discussion for the first time might well ask with astonishment : Are Dr. Ordronaux, Dr. Hay, and Dr. Elwell opposing the same doctrine ? It will be obvious that there must be most decided obscurity as to what moral insanity is in the minds of its opponents, if the contradictory nature of the arguments cited against it furnish any indication. It becomes absolutely necessary to understand just what is meant by moral insanity, in order to judge of the validity of the arguments cited. The views of some of those opposing it have already been cited, and were this paper purely controversial the matter might be left just here, as the authors cited contradict each other and themselves (which last is especially the case with Dr. Hay).

Prichard ⁴ says : " Moral insanity consists in a morbid perversion of the feelings, affections, inclinations, temper, habits, moral disposition, and natural impulses, without any remarkable disorder or defect of the intellect, or knowing or reasoning faculties, and particularly without any insane illusion or hallucination."

Lockhart Robinson ⁵ says : " We find that, either concomitant with intellectual disease or even singly (the moral insanity of systematic writers), the moral powers of the mind may be perverted or entirely obliterated ; insanity exhibiting itself in entire moral perversion, in inability to control conduct, and in total suspension of the natural affections."

Rush ⁶ stated that in many cases the moral sense was congenitally deficient, and this condition he called *anomia*.

Bucknill and Tuke ⁷ say : " The most lucid description of moral insanity which we have met with, is that given by Crichton Browne. ⁸ For this reason we quote it, quite apart from the authority which attaches to his opinion, because it was written a considerable number of years ago. The value of the facts, however, to which he refers and upon which that opinion was based is not affected by the course of time : ' Moral insanity is of frequent occurrence in early life. The intellectual faculties of the person affected by it remain entire and unimpaired. He is perfectly capable of perceiving and knowing and judging. He cherishes *no* delusion. He cannot in the ordinary and *legal* sense of the term be pronounced insane. And yet he is, to all intents and purposes of unsound mind, and as much requiring guidance, restraint, and treatment as the most furious maniac. He suffers from entire perversion of the moral principle, from the want of every good and honest sentiment. He is actuated by impulse, or by the most selfish, depraved, and cruel motives ; he presents, in short, a perfect picture of the desperado and ruffian. The existence of moral insanity, like the existence

of every thing else, has been called in question, and there are not lacking those who would send the moral monomaniac to the scaffold or penitentiary. ' "

Luther V. Bell⁹ speaks of moral insanity as being a form of insanity in which the moral sense is mainly, if not exclusively, involved.

Spitzka¹⁰ says : " Disorder of the moral sentiments may be congenital and equivalent to a partial imbecility, as the father of American mental science, Rush, first pointed out. The memory and the reasoning powers may be so slightly affected that their deficiency may be practically unnoticeable. * * * An intense egotism is sometimes found to lie at the root of the constitutional inability of the individual to recognize moral obligations to others. In such cases abstract moral conceptions may be inculcated by education."

Krafft-Ebing¹¹ says, respecting moral insanity, that the evident symptoms are a moral insensibility, an absence of all moral judgments and ethical conceptions, their place being supplied by purely logically based judgments of a utilitarian character. He adds that the moral rules of the community may be learned in a parrot-like way, but they always remain unassimilated conceptions and fail to act as a guide to the moral lunatic's actions.

Hughes¹² says : " Moral insanity is insanity of conduct, feeling, or impulse, or all combined, without such appreciable intellectual derangement that it would be recognized as insanity without the display of morbid feeling, impulse, or conduct. It may, as Esquirol thought, include *délire partielle*, and undoubtedly does in many cases, and still be entitled to be designated moral insanity, because of the predominance and overshadowing and overmastering character of the aberration of the moral faculties over the faculties of the understanding."

Gauster¹³ says : " Esquirol, Gratman, Prichard, Morel, Solbrig, Maudsley, and others have called attention to a certain class of psychic degenerations, ranged by Pinel under *manie raisonnée* and by Prichard under moral insanity. As was pointed out by Morel, these conditions are not always congenital. These mental states have been classified as affective monomania or as insanity affecting the feelings and the will. The patients are often morally perverted from their infancy. They are headstrong, malicious, disobedient, irascible to a very high degree, lying, and neglectful. They frequently manifest a tendency to violence and brutality. In adults there is often found a great tendency to mechanical pursuits. They often speak and act in a seemingly sensible manner and are regarded as of sound mind. They delight in intrigue and mischief, and sometimes indulge in sudden sexual and alcoholic excesses. They are extremely passionate and excitable, and attribute their excesses and passion to others whom they treat badly. They pass themselves off as heroes and martyrs."

Dr. Jewell¹⁴ says : " Leaving out of consideration all discussion as to names and terms, in regard to which there is generally more or less confusion, we find it admitted by very many of the ablest writers that the moral faculties may be affected without necessarily implicating the mental faculties, properly so called. Among them we need only mention Dagonet,¹⁵ Legrand du Saulle,¹⁶ and Flemming.¹⁷ * * * Clinically we do not see how we can explain morbid impulses which even generally sane people experience sometimes, and which require to be only a little stronger in these cases to impel their victim to the most absurd and even criminal acts against the exercise of their reason, without admitting the existence of a certain degree of moral irresponsibility. In such cases as these the highest moral sense may not be able to restrain the morbid tendency from over-

coming a weak will-power. But it is to cases where this moral sense is defective that the term moral insanity most properly applies."

Dr. Bannister¹⁸ of the Kankakee Hospital for the Insane says: "Whether we consider this moral sense as a primary feeling as seems probable for many reasons, or as a derivative one composed of still more elementary feelings, or as a necessary sequent of some other state it does not alter the case as regards the present question of moral insanity. By this term we mean a disease of the brain affecting alone its functions as the organ of the moral nature, disordering the capacity to receive moral impressions and the ability to control conduct for moral ends. This includes the so-called impulsive insanity, as well as that form in which moral impressibility is diseased."

Kahlbaum¹⁹ and Hecker²⁰ say that moral insanity is shown in biassed, childish judgment, readily transmuted into acts in violation of morals, for which the patient gives sophisticated excuses. With these there may exist striking ability in certain directions.

Todi²¹ says: "Moral insanity is shown in an innate tendency to evil; in egotistical, cynical, and cruel manifestations in childhood. On these congenital anomalies are often engrafted impulsive tendencies in later life."

Grilli²² says: "Every form of psychic disturbance may present symptoms rather involving the emotions than the intellect. Moral insanity proper is a morbid entity occurring in degenerated individuals, shown by instinctive depravity, the immoral nature of which is incomprehensible to the individual."

Bini²³ says: "Moral insanity is a symptom which may exist under various nosological types; there is a moral melancholia, a moral mania, a moral dementia, a moral imbecility, a moral monomania. The lucidity, logic, and skill

of the patient lead to his being taken for an eccentric, passionate individual, or a rascal to his detriment."

Clouston²⁴ says: "The morals or affections are lost or become altered in many forms of insanity. The question is: Have we any examples where from disease a man who had, up to that time, been moral and conscientious, and obeyed in his conduct the laws and the social observances, had lost his moral sense while he retained his intelligence and reasoning power, and in consequence of that diseased moral condition spoke and acted immorally? Further comes the question: Can he, when the diseased condition is recovered from, regain his former morality in feeling and conduct? I have no hesitation in answering both questions affirmatively, because I have seen such cases. It is not a question of theory but of fact. A third question arises: Do we meet with children so constituted that they cannot be educated in morality on account of an innate brain deficiency rendering them incapable of knowing the difference between right and wrong, of following the one and avoiding the other, of practising checks on inclination, of exercising self-control or obedience to the laws of God and man, of any love or cultivation of the good or any dislike of evil? Such moral idiots I, like others, have met with frequently. Persons with this disease and persons with this want of development labor under moral insanity."

Hammond²⁵ says, speaking of the victims of *manie raisonnée* (which is one of the synonyms for this psychosis): "The intense egotism of these persons makes them utterly regardless of the feelings and rights of others. Everybody and every thing must give way to them. Their comfort and convenience are to be secured though every one else is made uncomfortable or unhappy, and sometimes they display positive cruelty in their treatment of persons who come in contact with them. This tendency is especially

seen in their relations with the lower animals. Another manifestation of their intense personality is their entire lack of appreciation of kindness done them, or benefits of which they have been the recipients. They look upon these as so many rights to which they are justly entitled, and which in the bestowal are more serviceable to the giver than to the receiver. They are hence ungrateful and abusive to those who have served them, and insolent, arrogant, and shamelessly hardened in their conduct toward them. At the same time, if advantages are yet to be gained, they are sycophantic to nauseousness in their deportment toward those from whom the favors are to come. The egotism of these people is unmarked by the least trace of modesty in obtruding themselves and their assumed good qualities upon the public at every opportunity. They boast of their genius, their righteousness, their goodness of heart, their high sense of honor, their learning, and other qualities and acquirements, and this when they are perfectly aware that they are commonplace, irreligious, cruel, and vindictive, utterly devoid of every chivalrous feeling, and saturated with ignorance. They know that in their rantings they are attempting to impose upon those whom they address, and will even subsequently brag of their success. It is no uncommon thing for the reasoning maniac, still influenced by his supreme egotism and desire for notoriety, to attempt the part of the reformer. Generally he selects a practice or custom in which there really is no abuse. His energy and the logical manner in which he presents his views, based, as they often are, on cases and statistics, impose on many worthy people who eagerly adopt him as a genuine overthrower of a vicious or degrading measure. But sensible persons soon perceive that there is no sincerity in his conduct, that he cares nothing whatever for the cause he is advocating, that his cases and statistics are forged or inten-

tionally misconstrued for the direct purpose of deceiving; in short that the philanthropy or morality which he affects is assumed for the occasion. Even when his hypocrisy and falsehood are exposed, he continues his attempts at imposition, and even when the strong arm of the law is laid upon him, prates of the ingratitude of those he has been endeavoring to assist, and of the purity and disinterestedness of his own motives." He further says, speaking of the impulsive psychoses, that these last may "consist of an idea occurring in the mind of an individual contrary to his sense of what is right and proper, and urging him to the perpetration of an act repugnant to his conscience and wishes."

Dr. Mann²⁸ says: "There is in all cases of this form of insanity (he has seen) a total absence of delusion, and this may be said to be the great diagnostic mark of moral insanity. There is in these cases an entire change of character and habits, evinced by extraordinary acts and conduct. There are false assertions and false views respecting the best friends. The approach of this form of insanity is not sudden, but rather gradual and imperceptible. The strange character of the acts is not at first so well marked as it becomes afterwards. It generally takes some time before the patient's friends can convince themselves that such conduct is the result of disease, and many will look upon an insane patient's acts as the signs of depravity."

From the views cited it is clear that under moral insanity are comprehended, by those who accept the doctrine, three conditions: First, a condition of emotional involvement essentially; second, a condition in which the moral sense is not destroyed, but the patient is dominated by an imperative conception whose immoral nature he recognizes; third, a type in which the moral sense is congenitally absent or destructively involved by disease. In all three types the intellect, as a whole, is dominated, although not destructively involved.

The conceptions of the opponents of the doctrine concerning it have been in part given. Others, like A. E. Macdonald,²⁷ say that moral insanity and feigned insanity are convertible terms; just what is meant by this is not clear, and such a hazy conception of what is intended by moral insanity can be regarded only as a decided *lucus a non lucendo*.

Dr. Fordyce Barker²⁸ says: "Insanity is a disease characterized by perversion of the mental faculties, or of the emotions or instincts. A person may be insane without delusion. He may have the exercise of all the mental faculties, but by disease have his emotions so perverted from the normal or healthy action of these emotions and instincts as to destroy the power of his will to regulate his conduct. Moral insanity is something very different from this. It is wickedness. It is a term which in medical science is not found as describing a form of insanity, but loosely used to excuse or palliate crime which, on any other theory, would be inexcusable." This might, like the preceding citation, be regarded as another *lucus a non lucendo*, were it not for its history. The first part of the citation is based on Dr. Barker's clinical experience, and shows that Dr. Barker has recognized the existence of insanity without marked intellectual defect—without delusion. It is obvious that Dr. Barker obtained his entire ideas about moral insanity from the lawyer who coached him at the Guiteau trial, and that his conceptions of it were as hazy as those of Dr. A. E. Macdonald.

Dr. Sheppard²⁹ says: "In all cases which are included under Dr. Prichard's definition of moral insanity, it may be doubted whether, although there may be perfect freedom from delusions, there is not some disturbance of the intellectual faculties. Certainly in these cases which he has recorded, and which have been analyzed, the intelligence

does not appear to have been entirely normal." * It must be obvious that Dr. Sheppard has not read Prichard very carefully, or he would have seen that Prichard had not made the statement which Sheppard seems to believe that he did.

J. P. Gray³⁰ says: "Writers have endeavored to draw distinctive lines between ordinary wickedness and the 'moral criminal state,' by calling stealing 'kleptomania,' incendiarism 'pyromania,' murder 'homicidal-mania,' drunkenness 'dipsomania,' etc., etc. In all such cases the insanity of a relative is a most precious boon, as affording an avenue of escape, for heredity gives them the 'constitutional basis for the perverted moral state.' The history of cases in which such pleas have been entered and pressed would show that they have not been resorted to to shield only the weak-minded, the 'half-witted,' the natural-born incompetents and unfortunates, who really stand on the border line of imbecility, and approximate idiocy in their sense of responsibility. But history shows that it is the voluntarily bad, who happen to have means and friends to defend them, for whom this plea is raised; indeed the very infamy of their lives is paraded as evidence of insanity. It is an attempted stigma on the medical profession to boast that 'doctors can always be found to expert such cases for a fee.' It is, perhaps, true that in some cases doctors have gone on the stand for a fee, but in most cases they go on the stand really believing in such views of insanity, and supposing that it is possible to have the moral half of a man insane, and his intellectual half sound; and so have given the most absurd testimony in good faith." On the Guiteau trial he testified that: "Moral insanity is intended to signify a condition of perversion of the moral faculties or moral character of the individual, leaving the intellectual facul-

* I cite Sheppard as an opponent of the doctrine for reasons which will appear hereafter.

ties still sound. Inasmuch as I cannot conceive of any moral act or the exercise of any moral affection without any intellectual operation or mental action accompanying it, so I cannot possibly dis sever this mental unity. I look upon man in his mental condition as being a simple unit; that his mental being consists of his intellectual and moral faculties so united that every thing he does must spring out of them jointly. Disease is a thing of the body; a sickness of the brain. No physical sickness could reflect itself through the moral nature only." As a further elucidation of Dr. Gray's conception of moral insanity, we have the following resolution passed at his instigation by the New York State Medical Society at its meeting in 1882: "That the true function of the medical expert is to expound and interpret the results of the pathological conditions, and that in the absence of disease he is not justified in drawing conclusions as to civil responsibility from moral manifestations of conduct, that department belonging exclusively to law." It is evident from this that Dr. Gray does not believe that moral symptoms can be evidence of physical disease. The rest of his statements show a total misconception of the doctrine of Prichard. He opposes, however, the doctrine that immorality can be an evidence of disease. This is the first clear statement of views by an opponent of the Prichardean doctrine. Blandford is usually regarded as an opponent of the doctrine of moral insanity. He says: "Now, I deny that the absence of moral sense constitutes insanity any more than its presence proves sanity. It is perfectly true that it is absent in many lunatics, all notions of duty, propriety, and decency being destroyed in the general overthrow of the mind, but it is also true that we can find perfectly sane people, who either from early education and habit (the habit of continual vice, and also *hereditary transmission*) are devoid of moral sense to an equal

or greater degree. The gradual effacing of the moral sense and gradual hardening in vice have been portrayed by many a moralist, but something else is needed. To prove the disease or deficiency of mind we look for in the inhabitants of an asylum, I cannot help thinking that the authors who have most strongly upheld the doctrine of a moral insanity and the morbid perversion of the moral sentiments have often underrated or neglected the intellectual defect observable in the patients. Because no delusion has been found, it has been assumed that the intellect is not impaired, intellectual insanity and insanity with delusions being spoken of as synonymous. He further says: "In fact there can be no doubt about the existence of insanity marked by impulses." Blandford admits that insanity exists in which the most obvious symptoms are violations of morality, but claims that at the same time there is intellectual defect.

The ideas of the opponents of moral insanity as to what that doctrine is seem to be exceedingly contradictory, and are in marked contrast with the clear-cut conceptions of its upholders. The objection raised by Blandford, Mickle, Sheppard, and others of that school, is not to the doctrine that immoral acts are evidences of mental disease, but to the doctrine that the moral sense being destructively involved the rest of the mind remains unaffected; it will be obvious that Prichard's doctrine is fully consonant with their views, though not so understood by them. The objections of the Utica school are already met by the arguments of Blandford, Sheppard, and Barker (whose chief reputation as an alienist is among that school only). The question arises: "On which symptoms is stress most justifiably laid in cases of moral insanity?"

We have, then, from the opponents of the doctrine the following contrasted views:

HAY.—There is no insanity but delusional insanity.

BLANDFORD. — Because no delusions have been found, it has been assumed that the intellect is not impaired, intellectual insanity and delusional insanity being spoken of as synonymous.

F. BARKER.—A man may be insane without delusion. He may have the exercise of all the mental faculties, and by disease have his emotions so perverted as to destroy the power of his will to regulate his conduct.

SHEPPARD. — Insanity may exist without delusions.

GRAY.—There is no such thing as kleptomania, etc.

KEMPSTER.—I cannot conceive of an irresistible impulse.

BLANDFORD.—In fact there can be no doubt about the existence of insanity marked by impulses.

FORDYCE BARKER.—Perversions of emotions to such a degree as to produce a conduct entirely at variance with the individual's former life, and to such a degree as to completely control will-power, would constitute an irresistible impulse.

Dr. C. F. Macdonald, who opposed the doctrine of moral insanity as viewed from the metaphysical standpoint of mental unity, says respecting insane criminals that he has "been struck with the frequency of cases in which expressed delusions were absent, although the manner and conduct of the individual clearly indicated a delusional state. Comparing these individuals with their former selves, there are found clear evidences of a departure from their normal mental state. They become sullen, morose, and morbidly irritable. They rebel against the ordinary rules of discipline, and make unprovoked assaults upon those around them,

without apparent motive and without offering any explanation therefor. Their suffering from impaired bodily functions is shown by sleeplessness, loss of appetite, coated tongue, foul breath, constipation, a 'greasy' condition of the skin, and a livid, puffy appearance of the extremities, indicating a relaxed state of the blood-vessels. They are generally coherent in conversation, do not complain of being ill, nor apply for medical treatment. They frequently continue in the performance of their allotted tasks in prison for months, before the attention of those in daily contact with them is attracted to their mental disturbance. From this condition they either recover or gradually drift downward to complete dementia, with no outward exhibition of mental excitement to mark the course of disease. A certain proportion of cases, usually those of hardened criminals, are characterized, in their mental manifestations, by the most pronounced vicious tendencies, their insanity apparently expressing itself in a marked *exaggeration of the depravity and vice* displayed by them prior to the onset of their disease. On the mental side this is *substantially* the only evidence of disease which these cases present. Physically, however, their condition is more or less marked by the signs of bodily impairment above referred to. Known to the authorities as abandoned and depraved individuals, it is not surprising that their insanity is not recognized by casual observers, when it occurs." What is the most obvious symptom in these cases? Clearly, the insane immorality; the physical symptoms are frequently found in sane persons suffering from worry. Blandford's analysis of one of Prichard's cases is in the same direction. He says that the case is an example of what may be called moral insanity, if the *term* * is to be used at all. 'He had been an inmate of several asylums but his early history is not given.

* My Italics.

No delusions were ascertainable ; but he enjoyed in a high degree the art of lying and the pleasure of boasting. The former was applied to the production of mischief and disturbance. He was an adept at stealing, and secreted in his clothes and bedding articles of all kinds ; yet he possessed many good qualities, would be kind and useful in the gallery, and corrected obscene or impious language in others. His judgment was quick and correct, he had quick perception and strong memory and great discretion in matters of business. His madness appeared to me to consist in part in a *morbid love of being noticed*.* ’ ’

Dr. Blandford lays stress on the last clause. With the Guiteau case in mind it will easily be believed that had this man (whom Blandford regards as a lunatic) been tried for his life his “ morbid love of being noticed ” would have been regarded as evidence of sanity and his peculiar conduct would have been explained by his desire for notoriety, as witness the stump speech of Judge Porter and the evidence of Drs. J. L. Gray, Kempster, Macdonald, Stearns, Evarts, McLane Hamilton, *et illæ*. It may be averred that even with this man’s outrageous acts, his “ morbid love of being noticed ” would have been disregarded by every alienist of the Utica school. The most obvious symptom—the predominant symptom, is the moral perversion ; and if phthisis is to be named from a prominent symptom, nosology would justify the term moral insanity.

What, then, are the arguments against moral insanity? First : that based on the belief that mind is a unit ; second, an objection based on a self-contradictory dogma ; third, an argument from consequences. This last is a legal and not a scientific one, and may be valid in law but not in science—the object of which is to determine what *exists*. The last argument is voiced by Hay, who shows (as

* Dr. Blandford’s Italics.

also does Blandford) his psychological skill by mistaking the emotional depression in melancholia for a delusion. The melancholiac has not the delusion that he is sad; he is sad, and his condition is a purely subjective emotional state. It is strange that Blandford should make such a blunder; from Hay nothing better was to be expected, when his psychological sophistry (or, to be charitable, ignorance) already cited, is remembered. As has been remarked by Arndt, Ball, Eulenburg, Kräpelin, Krafft-Ebing, Mendel, Schüle, Spitzka, and others, pure melancholia is a form of insanity in which there is no disorder of the intellect, no delusion, no hallucination. It is one of the purest forms of affective or moral insanity. Concerning it Prichard says: "A considerable portion of the most striking instances of moral (affective) insanity are those in which a tendency to gloom or sorrow is a predominant feature. When natural to the individual and comparatively slight, it does not constitute madness. But there is a degree of this affection which certainly constitutes disease of the mind, and that disease exists without any illusion impressed on the understanding. The faculty of reason is not manifestly impaired, but a constant feeling of gloom and sadness clouds all the prospects of life." Guislain says that "every day melancholiacs are met with who do not exhibit any disorder in their ideas or judgment. Melancholia is exclusively an exaggeration of the affective sentiments; it is an emotional disorder (*gemüthskrankheit*) in the full German sense of that term. It is a pathological emotion, a pathological sadness, or fear, or chagrin, or dread, and nothing further. Theceptive faculties are not weakened by it." Griesinger says that "melancholia may be free from all involvement of the intellectual faculties and may not pass beyond the stage of moral (affective) insanity."

Hypomania (the subacute mania of some asylum reports)

is just the opposite state; a condition of pure emotional exaltation. Its pure form is an emotional state, and does not destructively involve the intellect, but dominates it. The objection based on the doctrine that the mind is a unit, is not valid against the Prichardean doctrine, but against the legal idea of moral insanity, which is cunningly fused with that doctrine. It may safely be said that no adherent of moral insanity believes that the rest of the mind is other than relatively sound; it is unsound because it is dominated and controlled by the morbid moral state. Viewed from a proper standpoint, there has not appeared a single valid argument against moral insanity. The opponents of the doctrine have demolished a figment of their own creation. Those who are scientific demolish in the most effective way the doctrines of those who are not, and the statements of some of the latter are self-contradictory.*

Summarizing, this table results :

Bonfigli's Figures.						Reality.					
Austria	.	.	.	.	0	Austria	.	.	.	.	4
Belgium	.	.	.	.	0	Belgium	.	.	.	.	2
France	.	.	.	.	10	France	.	.	.	.	20
Germany	.	.	.	.	9	Germany	.	.	.	.	20
Great Britain	.	.	.	.	2	Great Britain	.	.	.	.	16
Italy	.	.	.	.	3	Italy	.	.	.	.	9
24						71					

* An argument often used is the argument from authority, while this is hardly a scientific argument, still, as it is used by Dr. Bonfigli so confidently, it will not be conceding too much by attempting to determine what validity there is in his figures. He was able to find but twenty-four authorities who hold to the Prichardean doctrine of moral insanity, conditionally or otherwise. Nationally these are arranged by him as follows: Ten are French; the student of French psychiatric literature will recall the names of Ball, Bonnet, Brunet, Campagne, Cazaulvich, Dagonet, Esquirol, Falret, Foville, Georget, Gratiolet, Labé, Laségue, Luys, Legrand du Saulle, Magnan, Marc, Moreau, Morel, and Rousselin, as having enunciated views in perfect consonance with those of Prichard. Dr. Bonfigli has been able to find but nine German upholders of the doctrine; the literature of the subject reveals the names of Arndt, Flemming, Gauster, Gratman, Griesinger, Henke, Hettick, Jacobi, Jessen, Kelp, Kräpelin, Link, Masius, Mayer, Meckel, Mendel, Osiander, Schüle, Solbrig, and Som-

It is safe to doubt the value of such figures as these. There are more (nearly thrice the number) who accept the doctrine that insanity shows itself in immoral acts than oppose it.

Whether our ideas of right and wrong are innate, which Dr. Hay denies, or whether, as has been claimed by theistic as well as freethinking psychologists, these ideas, originally utilitarian, are inherited, might be considered an open question, but both views are consistent with this doctrine. Blandford admits that people may be born destitute of a moral sense. He claims that they are not insane; to be consistent he should admit that they are morally idiotic or imbecile, as Mayo did, and as, to be consistent, Hay would have to do. Dr. J. P. Gray, with the subtlety which is his predominating characteristic, saw the inconsistent blunder of Mayo, and the results of his attempts to avoid the same error are best told in the lucid English of Dr. Godding.³¹ "Wherein is this new enumeration of 'all the possible manifestations of insanity' with its convenient eliminations to be preferred to the old? It is Gray now but it was Ray then; and I wondered if that mental giant could come back from the shore where he has so lately gone to sleep, if we should not hear some such vigorous English as this: 'You cannot get rid of a fact by denying its existence.' That is the difficulty I conceive with Dr. Gray's insanity; he simplifies our psychological studies wonderfully, but what are we to do with those 'minds diseased' which his classification leaves out to shift for themselves? We must still keep the bounds of insanity essentially where

mer. In Austria, Krafft-Ebing, Meynert, Pohl, and Pick. In Belgium, Guislain and de Smeth. In Great Britain, Bonfigli finds two alienists; the literature of the subject reveals the names of Amsden, Bucknill-Tuke, Clouston, Crawford, Crichton Browne, Dickson, Haslam, Manley, Maudsley, Prichard, Lockhart Robinson, Savage, Wigan, Forbes Winslow, and Wood. In Italy, Bonfigli finds but three, yet a search of the literature discovers the names of Amadei, Biffi, Bini, Funaioli, Lombrosso, Tamassia, Tamburini, Todi, and Tonnini.

they were; or if we narrow them with Dr. Gray, we must set up another kingdom in disease and call that unsoundness of mind. Yet the doctor admits imbecility, which may or may not be congenital; but he shuts out idiocy, fearing perhaps that, admitting it, he might let in the moral idiot. But if insanity is to include all the clinically observed forms of disease that we have been accustomed to class as mental, and is to be regarded as synonymous with unsoundness of mind, then we must allow that this perverted condition of the intelligence that we call insanity, which is manifested in the thoughts, feelings, and actions of the individual, may be dependent either upon organic disease, disordered action, or imperfect development of the brain. I may agree with Dr. Gray in what he says so well about 'moral insanity,' and yet be willing to admit that those cases, of which the books record so many, had a real clinical existence, while holding for myself that the disordered mind does not cease to be a unit, although the observed manifestations of its insanity may seem to be confined in some cases to the emotions; in others, to the affections; and in still others, to the intellectual powers. We cannot deny that the old masters were as clear-sighted as ourselves. I dislike to hear drunkenness called dipsomania, as I often do; but I do not therefore say that dipsomania is only drunkenness. It might improve my standing with the legal fraternity if I should pronounce kleptomania only another name for stealing; but my personal observation convinces me that the insane have sometimes a disposition to steal, which is a direct result of their disease, and for which they are no more accountable than the puerperal maniac is for her oaths."

Spitzka says: "The mental state of the imbecile has been very well expressed by the statement that those mental co-ordinations acquired in the course of a higher civilization have not been formed in him. Moral defect is a promi-

nent feature of some cases, and this condition may be the chief manifestation of mental deficiency. There are subjects whose reasoning powers are fair, whose memory is excellent, who are, perhaps, accomplished in the arts, but in whom the moral sense is either deficient or entirely absent. The term moral insanity should be limited to this class of subjects, and a much better term would be moral imbecility." There are included under the term moral insanity pure emotional psychoses like hypomania and hypomelancholia, cases in which insanity is shown in impulsive acts like those of the periodical or exceptional dipsomaniacs, kleptomaniacs, and nymphomaniacs; besides these there are cases in which a moral sense is congenitally deficient, or fails to develop, or is destroyed in consequence of disease. Is the term moral insanity justifiable for all these differing cases? As a symptom designation it is, but not as a disease designation. It would be preferable to call the first type affective insanity, or emotional insanity, for in it the emotions are involved and dominate or pervert the intellectual faculties. It should be, however, remembered that immoral acts may result, especially in hypomania. The impulsive psychoses, also, have an element which entitles them to be considered "moral insanity," as the insanity of the individual finds vent in acts whose immoral nature is recognized by him. The cases in which the moral sense is destroyed by disease or absent from birth are alone entitled to be called cases of "moral insanity"; or, more properly, "moral imbecility," as the condition is closely allied to imbecility, and these cases may, as Spitzka has pointed out, manifest one-sided talent, as do imbeciles.

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REPORT OF A CASE OF SUDDEN LOSS OF VISION FOLLOWING ANÆSTHESIA OF THE FIFTH NERVE, WITH REMARKS ON THE MODIFYING EFFECT OF ANÆSTHESIA ON THE GALVANO-REACTIONS OF THE SPECIAL SENSES.

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R. F. A., æt. forty-eight, farmer ; muscular, well-developed, and healthy. Married three years ago. Never drank to excess, nor had syphilis. No history of venereal abuse nor loss of venereal power. Is subject to headache. Has always used tobacco freely—at times excessively.

Three years ago, while hiving honey-bees, he was stung on the left cheek, and was astonished to find that it gave him no pain. From this time he noticed the left side of face was quite numb. This numbness increased steadily for about two years, and was accompanied by a heaviness and pain felt mostly on the left side, though at times extending over whole head. At the end of two years he noticed that the sight of left eye was impaired. This rapidly grew worse, and in ten days vision in this eye was totally lost, not even light-perception remaining. At this time he came under the care of Dr. William Thomson, from whose notes I condense the following account of his visual condition : Vision : R $\frac{5}{6}$, L blind. Left eye diverges. Both pupils small and immovable. Inspection otherwise normal. Tension normal. No glaucoma. The third pair is not involved. Has adduction when right eye is closed. The divergent cast is not due to paralysis of the internal rectus muscle. Ophthalmoscopic examination of the left eye showed white atrophy, the disc being snow-white.

He was sent to Dr. S. Weir Mitchell for examination, and was subsequently turned over to him for treatment, being placed upon increasing doses of iodide of potassium, and later upon small doses of corrosive sublimate.

One year afterward, on the 8th of February, 1884, the patient found the right eye failing. In one week it was entirely blind.

Examination showed no light-perception in either eye; both pupils very small, and both upper eyelids kept up by forced effort. No cause could be assigned for the attack. The ophthalmoscope showed no decided change except, perhaps, overfulness of the retinal vessels. The patient was now turned over to me by Dr. Mitchell for treatment.

His condition was as follows :

Over left eye there is a partially anæsthetic spot, about four centimeters long by three wide, oval in outline, and extending laterally. A needle may be thrust entirely through the skin without pain, though distinctly felt by the patient. The anæsthesia gradually lessens as the periphery of the area is approached.

Electrical excitation of this area, by placing both poles within its limits, developed the following facts :

Faradic current : Sensation lessened.

Galvanic current : Local effect on *blood-vessels of the skin* normal, and fully as great as that produced on sound side. The local *galvano-sensations*, however, presented a decided deviation from the normal. The sensation of burning was normal. The sensation of tingling was about two thirds lessened.

Gustation.—The more distant effects of the current are also about two thirds lessened, three times the usual current strength being required to produce a gustatory sensation when the poles are placed in the impaired area.

Vertigo.—When galvanic interruptions of sufficient strength are transmitted through portions of the head or neck, certain vertiginous sensations are usually produced. In this case vertigo was readily produced when the poles were placed anywhere but in the anæsthetic area. In this area thirty-five cells were required, while but twelve sufficed for the opposite side of the forehead.

Vision.—No sensations of light can be produced in either eye

by the strongest current within the endurance of the patient. Applications were made to various portions of the fifth nerves of both sides, but equally without effect.

At the present time (June 1, 1884) the patient has been for two months under a treatment consisting of galvanic interruptions to the eyes and numb spot, and increasing doses of sulphate of strychnia, and as an apparent result there has been a decided increase of sensation in the left brow, and occasional flashes of light in the eyes. Simultaneously with the increasing sensation there has been a decrease in the number of cells required to produce both dizziness and the electric taste, and, on one occasion, a slight electric flash was obtained.

Fearing that the remarkable lessening of normal vertigo and taste originally found in this case might be due to an increased resistance at the anæsthetic spot, the amount of current actually passing through the circuit was carefully estimated by the deflection of a galvanometer needle. This deflection was exactly the same for each side, being at the time of experiment 2° for fourteen cells and 4° for twenty-two cells. The amount of electricity passing, therefore, could not have been different, and the difference in the results on the two sides can only be explained by placing these phenomena in the already large list of reflex actions—the integrity of one side of the arc in this case being impaired, with a corresponding impairment of the phenomena.

This solution of the “electric taste” and the “electric flash” was suggested some years ago by Althaus, in his work on Electro-therapeutics. Besides a corroboration of the facts observed by him, the importance of the case here related consists in the clear relation established between the restoration of sensation and the return of the phenomena.

ON THE ARTIFICIAL INDUCTION OF CONVULSIVE SEIZURES.

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THE observations upon which these experiments are founded were first suggested by certain phenomena noticed during experiments upon table-tipping. Several years ago, in association with Dr. B. F. Lautenbach, formerly of the University of Pennsylvania, and Professor Elihu Thomson, formerly of the Central High School, we conducted a series of experiments to analyze more thoroughly the exact nature of certain convulsive seizures which were brought prominently to our notice during the progress of these experiments.

We present an account of these seizures which may be induced at will. This state differs widely from that of hypnotism, having but few factors in common with it. Heidenhain, it is true, occasionally noticed convulsive movements in his subjects, but these were always associated with the hypnotic state; that is, there was always present more or less modification of consciousness. Richer, also, in his investigations at the Salpêtrière, noticed certain epileptoid phenomena in connection with the state

of lethargy. These may bear some relation to our own observations. He describes them as follows: "At the beginning of the sleep, whatever method was employed for producing it, we have almost always observed in our patients some epileptoid phenomena: slight rigidity of the members, movements of deglutition, 'bruit pharyngien,' whistling inspiration, froth at the mouth."

Our own experiments were performed by subjecting one or a group of muscles to a constant and precise effort, the attention being at the same time concentrated upon some train of thought. The position we most frequently adopted was the following: The subject being seated, the tips of the fingers of one or both hands were so placed upon the surface of a table as to give merely a delicate sense of contact; *i. e.*, the fingers were *not allowed to rest* upon the table, but were maintained, by a constant muscular effort, *barely in contact* with it. Any other position involving a like effort of constant muscular adjustment was found to be equally efficient. Any one object in the room was now selected, and the mind fixed upon it, or some subject of thought was taken up and unswervingly followed.

After the lapse of a variable period of time, extending from a few minutes to an hour, and depending upon individual peculiarities to be noted, *tremors* commenced in the hands. These tremors became rapidly magnified into rapid movements of great extent, sometimes to and fro, sometimes irregular. If the experiment was now continued, the muscles of the arms, shoulders, back, buttocks, and legs, became successively affected, and the subject was frequently thrown violently to the ground in a strong general convulsion. The muscular contractions frequently became tonic, so that opisthotonus, emprosthotonus, and the most bizarre contortions were produced in various degrees.

The muscles of expression and those of respiration were

frequently affected along with the others. Wild gasps, distressing sobs, shrieks, and discordant cries were often produced. Immoderate laughter and crying, the latter often accompanied by an outflow of tears, were likewise observed, and, strange as it may seem, the corresponding emotions were either not present at all—certainly not in ourselves—or suggested to the subject in but a faint degree.

Seizures equalling in violence a general convulsion were by no means induced in all subjects, and were generally the result of experiments repeated many times during the same evening. It should be observed that the more frequently the experiments were performed the more readily the seizures were brought on, and, other things equal, with successively increasing intensity. In ourselves, after experimenting for several weeks in succession, the convulsions were induced with such alarming ease, it was thought advisable to desist for a long time.

An analysis of our observations leads to the following results:

In the first place, *no disturbances of sensation* were at any time present. Especial attention was paid to sensory phenomena, but none were at any time observed. It is important to bear this in mind.

Disturbances of *motion* constituted the prominent feature of the state. They consisted of movements involving one or more limbs or the entire body, and were produced by clonic spasms of the muscles, which, in their turn, were frequently followed by tonic contractions.

Whenever the respiratory and laryngeal muscles were involved, disturbances of *respiration* and *phonation* were present. The breathing at such times was generally spasmodic, and automatic cries were uttered. The involvement of the diaphragm was especially noticed in one of ourselves.

In the severe seizures, the *circulatory apparatus* was pro-

foundly affected. The pulse became rapid, and in extreme convulsions became intermittent. In some instances, when the paroxysm was at its height (*i. e.*, intense clonic or tetanic action of all the muscles), a momentary arrest of the heart's action was noticed. Now and then auscultation of the heart at the end of a severe seizure revealed a bruit which, though of short duration, reminded one of a similar sound sometimes heard in chorea.

Regarding the *secretions*, with the exception of a flow of tears and occasional profuse perspirations, no other symptoms were noticed, except in two instances. In these, after the persistent induction of severe seizures for several hours, large quantities of pale urine were voided. As these phenomena were not observed as usual concomitants of the condition, it may be well not to lay too much stress upon them; yet their occasional occurrence is in the highest degree suggestive. Perhaps, had the experiments in all cases been carried to the same extent, the same results would have been observed.

The *reflexes* were distinctly exaggerated. This was readily demonstrated when the experiment had been carried on sufficiently long to produce decided convulsive movements of the arms and legs. If a subject was examined immediately after a seizure, the patellar reflex was almost always found to be increased. At this time tonic contractions of muscles could easily be induced, for example, by forcible flexion of a limb, though these contractions would be of *short* duration. These observations are in harmony with those of Heidenhain, who speaks of increased reflex irritability and tonic spasm of the muscles as being observed in his hypnotic experiments. Richer, in one of the forms of lethargy induced by him, noticed a similar condition. Our own observations differ from those of both of these investigators, in that these phenomena are present for but a short

time. The knee reflex, for instance, resumes its normal character within a few moments after the cessation of a convulsion. It seems as though this short period of reflex irritability was but the result of an exalted functional activity of the cord preserved for a few moments after the convulsion itself had ceased.

As regards the *psychic* phenomena, there was, in the first place, *no modification of consciousness* ever observed. There was, however, a *progressive abeyance* or *paresis of the will*. That is, although the mild forms of the state, such as tremor or slight convulsive movements, could be controlled by a slight effort, each successive seizure required a stronger or more intense exertion of the will. Finally, all control over the seizure was lost. In a general convulsion or severe tetanic condition, the will was absolutely powerless.

We observed, also, another curious fact. When one of a number of subjects was affected, one or more of the others would shortly follow. This occurred even when the latter were not complying with the terms of the experiment, provided only that they had previously been affected. This state, therefore, appears to be *contagious*, very much as a yawn is contagious; probably by unconscious suggestion.

Regarding temperament, it was noticed that persons with a neurotic element in their composition were more readily affected than those who were dull and heavy. Those, also, who were unable to concentrate their attention for any length of time proved poor subjects, while others, again, seemed utterly incapable of maintaining a *delicate* contact with the table. They invariably, after a few moments, allowed the fingers to *rest* upon the table. Of course, under these circumstances, no tremor or convulsive movements followed.

Strong and muscular men, other things being equal, were found to be affected less readily than weak men.

Another remarkable fact noticed was, that nitrite of amyl appeared to arrest the convulsive seizures at once. At least this was the result obtained in the few trials that were made with it. Particularly was this action noticed in reference to the momentary interference of the heart's action. Richer speaks highly of its action in hystero-epilepsy, and this fact, coupled with its action in true epilepsy makes the results we obtained doubly suggestive.

Our experiments were conducted, not only upon ourselves and immediate relatives, but upon a large number of friends, both male and female, though upon the latter, for obvious reasons, the experiments were never pushed to extreme degrees.

There can be no doubt that the state described in this communication bears a distinct relation to hysteria, if not to convulsive seizures in general. No doubt it bears a distinct relation to many of the phenomena presented by certain religious sects, as the "Shakers" and "Jerkers." No doubt it explains the antics of the supposed victims of the Salem witches, the Tarentism of Italy, the epidemic chorea of Germany, the dancing Dervishes, the contortions of the Convulsionaires, and a hundred other things too numerous to mention. Possibly, and very probably, it is one of the atoms of truth around which are collected the follies of spiritualism and table-tipping. It is one of those curious states which has been too little, if at all, studied.

Having now in a general way given an account of these convulsive seizures, we now venture to propose an explanation of them. In order that we may be thoroughly understood, it will be necessary to consider a few general points in relation to the mode of origin of the neuro-muscular system; principles deduced from comparative anatomy and embryology.

Animal motions are a resultant of certain changes taking

place in protoplasm. In the simplest forms of animals these motions take place in an apparently indefinite manner. Thus, in the *amœba*, motion appears as a mere indefinite ebb and flow, apparently without fixity, apparently without system, nor are they due to any visible apparatus.

As we advance, however, we find that this original indefiniteness of motion is succeeded by fixity and definiteness. At first we find merely fixity as regards direction of flow, as in the pseudopodic rays of the Foraminifera and Radiolaria. Eventually this mere ebb and flow is succeeded by definite motor appendages, as cilia, etc., in the infusoria; or the body itself may, as a whole, take on a pulsatory action to move it from place to place.

As we advance through the animal kingdom, however, we find a special apparatus developing, known as the neuro-muscular system. In its earliest condition it appears as the so-called neuro-muscular cells of Kleinberg, as found in hydra. These cells are simply irritable and contractile. As differentiation proceeds, we find this system separating into two portions, one an irritable portion, the other a contractile portion, known respectively as nerves and muscles. Now, Herbert Spencer has shown, in one of his works, that the evolution of a neuro-muscular system is a necessary consequence of certain dynamical laws. Given a homogeneous animal, exposed to all the forces of its environment, there must, as a necessity, follow, that in the animal certain lines of least resistance to the passage of ingoing and outgoing motions must be formed. The nervous system, therefore, represents, *primitively*, merely specialized tracts for the transmission of motion. With increased specialization many other functions appear. Not only must the nervous system, therefore, be a means of correlating the animal with its environment, but it must also have the function of correlating the various parts of the animal body.

It would appear, therefore, that constant adjustments and readjustments are taking place; and further, as we shall see, these changes are rhythmical. Again, we are obliged to refer to those most remarkable inductions of Spencer, one of which is the universality of the rhythm of motion. Without going into a detailed account of the causes operating to produce this universal rhythm, we may safely assert that there continually flows through the whole nervous system of every living animal a constant rhythmical interchange of motion between all parts of the body; and this is what might, perhaps, be called *nervous equilibration*.

Leaving out of consideration the lower animals, with which, at present, we have no concern, we may at once pass to the consideration of the neuro-muscular relations, as they exist in the higher animals, of which we shall take man as a type. In man we find a central nervous system, from which we have passing to and from all the parts of the body nervous tracks. These end in motor organs, glands, etc. In studying the relations of the motor organs to each other, we find that they may be divided into two classes, one group producing motion in a particular direction, whilst the function of the other is to antagonize this action, and bring any part of the body back into the particular condition from which it was removed. During these actions and reactions of groups of muscles, flexion, extension, pronation, supination, etc., we find that the action is not a *continuous* one. The particular muscle or muscles are thrown into a series of rhythmical contractions. These contractions have been recognized and described, for a long time, under the name of the muscular susurrus.

Perhaps considerations of this kind may appear somewhat irrelevant, but we think it will be found that these rhythmical functions of the nervous system lie at the foundation of an explanation of these artificially induced convulsive seizures, if not in all others.

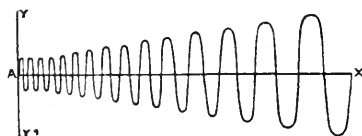
We have already described the methods by means of which these artificial seizures may be brought about. Now let us consider under what particular conditions the neuro-muscular apparatus is placed during experiments of this character. Thus far we have considered the action of the neuro-muscular system as a mere ebb and flow of motion, without respect to any controlling agency. In man, we find an element entering which we have thus far not discussed, viz., the will. Undoubtedly the will, within certain limits, modifies and controls the actions of the muscular system. How far the will is able to modify and control is, we think, tested by these experiments.

A person places his hands, or perhaps any other part of his body, in a position of effort. According to the view advanced above, what must happen? Evidently, as we have already shown, there must be a rhythmical series of motions taking place between the antagonistic groups of muscles, because the rhythms of these cannot be synchronous.

At first the will restrains any tendency to marked vibration in the part; but, as we already stated, let the mind be directed into any particular channel of thought, which simply means concentration, and as a result a loss of intensity in will-power as regards other channels. Hence in a case where antagonistic groups of muscles in a state of strain are left, as it were, to themselves, the restraining influence being either diminished or else held almost in abeyance, we find as a result of the exhaustion of neuro-muscular protoplasm that a disturbance must take place. This disturbance must necessarily be rhythmical. Hence we have a rhythmical motion of the part as shown by increased tremor. The action continuing, the tremor is succeeded by to-and-fro movements. At first it affects only the parts under strain, but this disturbance, which might perhaps be considered a purely local phenomenon,

spreads through the mobile channels of the neuro-muscular apparatus and affects it as a whole. Thus we see that beginning with tremor of the hand, we finally have the flexors and extensors of the forearm thrown into violent clonic contractions. Next the muscles of the arm and shoulder are involved. At last, such a violent explosion takes place that the neck, the back, the legs, the diaphragm, the heart even, are affected. A small cause is thus apparently able to produce the most profound results.

We might, perhaps, be permitted to express these results graphically.



Let $A X$ = time of experiment, and $A Y$ and $A Y' =$ amplitude of rhythmical movements.

At the commencement of the experiment the curves express the normal rhythm between the antagonistic muscles, which is the resultant of the composition of the normal rhythmical motions of the individual muscles in the opposed groups.

As the time $A X$ increases, we find the amplitude of the rhythmical vibration steadily increasing up to the limits of exhaustion.

In this brief communication we have simply attempted to present a group of phenomena, produced artificially, which seem closely related to certain nervous affections.

THE CASE OF JOSEPH TAYLOR, AN INSANE PRISONER CONVICTED OF MURDER IN THE FIRST DEGREE.*

By CHARLES K. MILLS, M.D.,

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ON Friday, October 31, 1884, in the Court of Quarter Sessions of Philadelphia, Judge Ludlow presiding, one Joseph Taylor was convicted of murder in the first degree. Taylor belongs to a class referred to by Assistant District-Attorney Bregy as a breed by itself in the community—a social Pariah, to whom family ties are scarcely known, whose hand has ever been against public order, and with whom society has ever been at war.

At the age of nineteen he was arrested, convicted, and imprisoned for larceny. Three times since he has served terms for crimes of violence.

On the thirty-first of May of this year, Taylor, then and now a convict in the State Penitentiary for the Eastern District of Pennsylvania, killed, under circumstances of great atrocity, one of his keepers, Michael Doran. It was for this crime that he was brought to trial and convicted of murder in the first degree. In his defence it was alleged that he was insane. Independently of any general considerations of the individual and his class, his case, in its

* Abstract of a paper read before the Medical Jurisprudence Society, of Philadelphia, November 11, 1884. This paper will also appear in *The Polyclinic* for December 14, 1884.

medico-legal aspects, is an interesting one, from several points of view—from the nature and manner of the crime committed, from the thoroughness of his defence, from the peculiar standpoints taken by the prosecution and the Court, and from the special issues raised during the progress of the trial.

I will, this evening, not go over, in detail, the history of the crime and the story of the investigations of Drs. H. C. Wood, S. Preston Jones, and myself. A full report of the case, particularly in what might be termed its clinical features, will be published elsewhere. The fact that Dr. H. C. Wood will follow me this evening with a paper on some of the "Absurdities of the Law," as illustrated in the case, also induces me to limit my own comments.

In brief, the conclusion of Drs. Jones, Wood, and myself, after all the investigation that the time at our disposal would allow, was that Taylor was insane—a delusional monomaniac, of what might be termed the criminal or prison type.

We found, or believed that we found, that Taylor was the subject of well-marked delusions of persecution. These delusions were more or less co-related or connected, and had reference: (1) to the putting of injurious or poisonous medicines into his food and drink; and (2) to bad treatment from the warden, keepers, doctor, and prison officials generally. The medicines, he believed, made him cold, had affected his lungs, stomach, bladder, and sexual organs, and were slowly killing him. The officials, he believed, were down on him, and wanted to kill him, because they were Catholics and he was a Protestant, and because he had talked against them when he was out.

Sometimes he connected the idea of medicine being put into his food and drink directly with that of being persecuted by Catholic officials, and sometimes the "official"

and "Catholic" persecution presented itself as a special delusion. His delusions took one other connected phase, in that he referred to his mother, who was a Catholic, as having "made him something nature never called him for to be,"—by which, it was developed by our examinations that he meant she had ruined him from his birth in his sexual organs and inclinations. He also apparently had one other line of delusion, namely, as to the injustice of his various convictions; but no stress was laid upon this point by the medical witnesses, as it was difficult to determine whether the idea was a delusion or not, and it would have been still more difficult to have demonstrated such a fact to a judge and jury.

(Dr. Mills then made some general remarks on the subject of delusional insanity, particularly delusional monomania. He said that he was convinced that the most elementary knowledge on this subject was wanting in the legal profession, and even to a large extent among medical men. Reference was made to the writings of Dr. E. C. Spitzka, who in special articles and in his text-book¹ has clearly set forth this subject, and to whom American psychiatry is deeply indebted. Systematized and unsystematized delusions were explained and illustrated. It was stated, as bearing on the case of Taylor, that, as Spitzka has shown, among persons of low mental grade, among the majority of criminals, for instance, it is not always easy to draw the line between systematized and unsystematized delusions. Many of their delusions present a partial or imperfect systematization. Monomania was also defined and explained. Systematized delusions were shown to be among the most striking characteristic of that form of insanity which is technically known as delusional monomania, serving to separate cases of monomania from cases of mania, melan-

¹ "Insanity: Its Classification, Diagnosis, and Treatment." By E. C. Spitzka, M.D. New York, Bermingham & Co., 1883.

cholia, parietic dementia, and several other well-marked clinical forms of mental disease.)

Taylor was a young man, but an old convict. At the time of the commission of the murder he had been in the penitentiary for many months. His alleged insanity, so far as evidence could be obtained, began long after his last commitment, and a few months before the crime. This leads me to look into the question of delusional insanity among prisoners.

It is said sometimes, and with a show of reason, that medical men unconnected with prisons, however well they may be acquainted with the general subject of insanity, have not had the special experience with criminals which qualifies them to judge correctly in cases like that of Taylor. The principles and methods of detecting real from feigned insanity, or of determining as to sanity or insanity, however, are much the same in or out of prisons; and the opposing argument is just as forcible that those connected officially with prisons are too apt to cherish notions about the "crime class" which prevent them from fairly giving a hearing to the question of insanity among criminals.

That true delusional insanity is of comparatively frequent occurrence in prisons must be admitted by all unprejudiced observers.

David Nicolson, M.B.,¹ an English authority on criminal psychology, has divided the special delusions of prisoners into four sets, as follows:

1. "Special delusions as to the unfair treatment which he receives as a prisoner, by the infringement of his 'rights,' or by undue punishment.

2. "That the food he gets is tampered with by the addition of poisonous or deleterious substances.

3. "That he has mysterious visitations and communications (mostly associated with thoughts of home or guilt).

¹ The *Journal of Medical Science*, April, 1874.

4. "Of the original injustice of his conviction and sentence to imprisonment."

Nicolson is dealing, in this enumeration, with cases of genuine insanity. "Solitary confinement," says the same observer, "is especially apt to give rise to mental disturbance, and is well known to favor the occurrence of delusion, and hence it was found necessary to limit the 'separate' stage of penal servitude, in the English prisons, to nine months."

As one of our daily newspapers¹ put it, the other day: "It is not Taylor who killed one Doran, who is really on trial—it is the system of separate and solitary confinement which is enforced in the chief penal institution of the State."

Every one who has been connected, as physician, with the Eastern Penitentiary, will tell you that many of the prisoners become "suspicious," are "full of notions," "cranky," etc., although, perhaps, that they are really delusionally insane may not be admitted.

I do not believe that all of this class are insane. Some never get beyond the domain of suspicion and mistake; but, on the other hand, not a few pass over into true insanity, from which, in some instances, they recover, and in others they do not.

The very natural query arises, Are not delusions sometimes shammed by prisoners? They are, without doubt.

Forms of insanity which allow of emotional display, or of appearances of stupor and weakness, are most likely to be shammed, both inside and outside of places of confinement; but that even delusions are sometimes spurious, that is, either imitated or simulated, is well known to every practical alienist.

"Prisoners," says Nicolson, with whom I accord, "*sham* delusions, as they are found to sham almost every other morbid condition."

¹ The Philadelphia *Daily News*.

Drs. Wood, Jones, and myself were on our guard against such deception in the case of Taylor.

In the first place, it has been denied that he had any delusion, genuine or spurious. It has been held that he was simply suspicious, or, at the most, that he was only mistaken in opinion.

"A mistake," says Ray,¹ "respecting a state of facts will always be admitted by a sane person on adequate proof of error. The false belief of the insane, call it mistake or delusion, is never relinquished. No array of proof, no force of argument, even by those in whom they always had the fullest confidence, can make the slightest impression. On the contrary, they cling to their belief all the more firmly, the stronger the reason offered against it."

It was shown thrice over, even in this case, that, measured by these tests of Ray, and by others still stronger, Taylor's false beliefs were clearly insane delusions.

Instead of showing that Taylor was the victim of a mistake, the Commonwealth, in fact, simply brought out admirably, by their witnesses and their methods of cross-examination, the manner of the growth and development of special delusions of the kind shown by the prisoner.

"One peculiarity of such special delusion is that they all (except some of those connected with midnight visitations) deal with *possibilities*; thus a prisoner *may* be ill-used; his food *may* be tampered with; he *may* be innocent of the crime of which he is convicted. Improbable as they may be, they are nevertheless not impossible, and they are free from that absurdity and incongruity which characterize so many ordinary delusions. And this peculiarity of special delusions is one of the best, perhaps the best, evidence of their *growth*. They start from an idea which in itself is not only conceivable and possible, but which is more or less

¹ "Contributions to Mental Pathology." By J. Ray, M.D. Boston: Little, Brown, & Co., 1873. Page 346.

naturally suggested by circumstances. And as the effect of imprisonment is to bend the mind inward on itself, the idea repeats itself and thereby gains ground, until it finally establishes itself in a morbid diseased state.”—NICOLSON.

The Commonwealth showed that Taylor had been given a six-ounce mixture of bromide of potassium, and also some hydrobromic acid. It was also shown that these drugs would have some effect on his sexual inclinations; and hence it was argued that when Taylor believed that medicine was being put in his hydrant water, and in his tea, and in his coffee, it was not a delusion, but a very natural thing for him to suppose this, and also to suppose that this same medicine had produced a bad effect on his sexual organs. Drs. White and Robinson were asked how long the effect of bromide of potassium and hydrobromic acid would last in the system, and said that evidence of the presence of bromide of potassium could not be detected more than a month after its administration. When asked whether bromide of potassium or hydrobromic acid administered in February and April, and possibly in May, would have a depressing effect on the sexual powers in June, July, August, September, and October, they, of course, said “No.”

Taylor received medicine in a legitimate way; but he imagined that he was given medicine surreptitiously. He never speaks of being given medicine in a legitimate way; and this is a strong point in favor of the view that his belief was really a delusion.

It was contended, again, by the Commonwealth, that Catholics were employed in the prison; that Mr. Cassidy, the warden, and a number of the keepers, perhaps one half, were of the Catholic persuasion, and therefore Taylor's denouncing these men as Catholics was no evidence of delusion.

A delusion must be looked at in two ways—as it refers to the state of mind, and also as it refers to what may be or may not be the fact. Taylor's idea about Catholics, or persecuting Catholics, was a false belief. Whether they were or were not Catholics did not bear on the question, so far as the delusion is concerned. His delusion was the idea of persecution. The truth is that while some of the men he referred to were undoubtedly Catholics, others were not. Dr. Robinson was not a Catholic. His delusion was not in reference to Catholics, but to persecuting Catholics. It is perfectly clear to me that a man may have a delusion as to marital infidelity, and at the same time his wife may be unfaithful. He may believe that this, that, or the other man—it may be the governor of the State or the mayor of the city—has improper relations with his wife, and it may be that his brother, or his journeyman, or somebody else does have improper relations with her, and yet his belief may be a delusion. The delusional lunatic does not believe a thing because he has evidence, or because he knows it to be true, but because he is in a delusional state.

If he was not mistaken, he was either insane or simulating insanity.

The most important evidence indicating that he might have been simulating insanity, was the testimony of Dr. Robinson in reference to Taylor, "playing the crank."

Three or four days before the murder, he had told Dr. Robinson, in effect, that there was nothing in the crank business, and that he was ready to give it up and go to work. The doctor does not and did not state in so many words that Taylor said: "I am going to give up the crank business about medicine." As, however, he had been charged with playing the crank about medicine, therefore, when he said that he was going to give up the crank business, the doctor understood him to refer to the taking of medicine.

It might have been even more positively stated by Taylor than it was, that he was going to give up the crank business, and yet it would not have absolutely influenced my opinion. Every one who knows much about insanity, knows, in the first place, a point which people seem to forget, that many lunatics are atrocious liars. Many patients in insane asylums will easily outdo Ananias. The motives, if there be motives, which impel an insane man to lie are often inscrutable. In the second place, if you go to those who have been with the insane for months or years, you will learn that an insane person may, at times, and for a reason, suppress his delusion. In the third place, there is not an iota of evidence in Taylor's case to show that he did refer to medicine at all when he said he was going to give up the crank business. He may have had an entirely different notion.

Another matter that inclined impartial observers, first in one way and then in another, was the conduct of Taylor himself during the trial. During the first day of the trial he had three outbreaks, two of which were violent, while the third was suppressed. This impressed many at the time with the view that he was insane. It impressed others that he was shamming. During the subsequent days he kept comparatively quiet and had no severe outbreaks. He would sometimes jump up, and occasionally make remarks to those about him. My own belief was, after having seen him in the two severe and the one partial outbreak, and knowing of the attacks which he had during our interviews, that his conduct was corroborative evidence of his insanity. He told me, practically, what he told Dr. Robinson, that he would show the damned Catholics up in court. He told Dr. Robinson that there would be a picnic in the court.

When a delusional lunatic, of Taylor's type, gets the time,

occasion, or opportunity, or when he gets into a condition of excitement or frenzy, he may do as this man did. At the beginning of the attacks in court, he acted exactly as I had noted in my interviews with him when he became excited. He rubbed his hands, his breath came hard, he grimaced, and then jumped up. He did not scream or cry out. Dr. Wood told him, after the second outbreak, to keep quiet or they would bring him in insane. He did not want to be brought in crazy, and afterward, on a third occasion, not noted in the newspapers, some testimony was being given against him, when he said: "They did give me medicine," and began to get into frenzy, but was suppressed. An insane man as well as a sane man can be suppressed.

Other reasons for considering him insane are: the long adherence to the one idea; the fact that his symptoms were in accord with a certain type of insanity; the mode and ferocity of his crime; the fact that he made no attempt to escape; the absence of any sane motive; the consistency, with no overdoing, of his actions; the fact that the prisoner believed that he had a good defence in his delusion about medicine.

Mr. Cassidy, the Warden of the Eastern Penitentiary, is the best prison official in this country. The keepers, as I observed in going through the penitentiary, are good men, who have apparently been largely chosen for their manliness, courage, physique, and moral character. Dr. Robinson, the physician, is a well-educated physician of but a few years' experience, but this experience has been among criminals, and his opinion is, therefore, entitled to consideration. Prison officials have acumen and experience in detecting shamming, but they are not always able to detect what is beneath it. They do not perhaps fully understand the fact that a man may simulate insanity and yet be really insane and irresponsible.

The question of responsibility was made prominent by the Court during the progress of the trial. I was questioned as to whether I believed a delusional lunatic, or any insane man, if impelled to the commission of a crime by wrath, anger, revenge, etc., was a responsible being; and answered, in effect, that a delusional lunatic, of the type before us, was in such a frame of mind that it was practically impossible to separate his delusional condition from ideas of wrath, anger, revenge, etc.; that we must have special instances before us; that if an insane man does an act from an insane motive, connected with his delusion, he is not responsible. It has been held in some quarters that to answer such a question at all directly was an invasion of the province of the Court. When on the following day the Judge asked Dr. Wood if a delusion such as Taylor had would render him irresponsible, the Doctor replied that if responsibility to the laws of the land was meant, he thought that it was the province of the Court to decide. I certainly do not lack in deference to the Court, and especially when represented by the eminent learning and integrity of Judge Ludlow, but to my mind the question of responsibility in the case of a man who is on trial for his life and is being defended from a medical standpoint, is one to be frankly met by medical witnesses.

If his Honor had asked me whether or not, under a decision or decisions of the Supreme Court of Pennsylvania, Taylor might not be regarded as responsible, my answer might or might not have been different.

Law certainly has not kept pace with medical science on questions of insanity, and no advance can be made in the solution of these problems and responsibility, if a medical witness is simply expected to say what is the law.

Presumably, if such a witness is asked as to the responsibility of an individual about whom he is testifying, the

question has reference to his opinion as to moral accountability. The judge not being a cross-examiner, the witness is not to suppose that he is being tested as to his acquaintanceship with certain legal dicta, which must be better known to the Court.

If decisions are wrong, and not in accordance with the knowledge of the day, in the name of truth and justice we should have new decisions and better law.

Speaking of the tests of responsibility, Ray¹ says: "The truth is, there is no single character which is not equally liable to objection. Jurists who have been so anxious to obtain some definition of insanity which shall furnish a rule for the determination of responsibility, should understand that such a wish is chimerical, from the very nature of things. Insanity is a disease, and, as is the case with all other diseases, the fact of its existence is never established by a single diagnostic symptom, but by the whole body of symptoms, no particular one of which is present in every case."

I may repeat here what I have said in another place,² that I agree with Dr. Nicolson, that in a bill drafted by Sir J. Fitzjames Stephens, and introduced into the House of Commons in 1874 by the late Mr. Russell Gurney, is found the common ground upon which the varied and discordant estimates of criminal responsibility may be harmonized. It suggested for enactment that "homicide is not criminal if the person by whom it is committed is, at the time when he commits it, prevented, by any disease affecting his mind: (*a*) from knowing the nature of the act done by him; (*b*) from knowing that it is forbidden by law; (*c*) from knowing that it is morally wrong; and (*d*) from controlling his own conduct. But homicide is criminal, although the mind of

¹ "Treatise on the Medical Jurisprudence of Insanity." By J. Ray, M.D. Fifth edition, 1871, p. 39.

² "Transactions of the Pennsylvania State Medical Society for 1882": Address on Mental Disorders.

the person committing it is affected by disease, if such disease does not, in fact, produce some one of the effects aforesaid, in reference to the act by which death is caused, or if the inability to control his conduct is not produced exclusively by such disease. If a person is proved to have been laboring under any insane delusion at the time when he committed homicide, it shall be presumed, unless the contrary appears or is proved, that he did not possess the degree of knowledge or self-control hereinbefore specified."

Wharton,¹ speaking of the common monomaniac delusion of persecution, and discussing the question of incompetency and irresponsibility in this disorder, says: "The question must be determined concretely as to each case by the history, conduct, and examination of the patient himself. It may, however, be generally said that when a delusion is transient; when it is capable of being repressed, when the patient takes steps which show that he is conscious of its unreality, when it can be dispelled by the force of counter-vailing considerations, then mental unsoundness is not to be assumed. It is otherwise when the delusion, however it may be concealed, is, on the one side, in itself palpably absurd, and yet, on the other side, it is cherished by the patient as a radical belief. If such be the case, then, as to acts which are the product of such delusions, the patient is to be regarded as incompetent and irresponsible. And as to acts not the result of such delusion, his mind may be regarded as so enfeebled or confused as to subject him only to a diminished criminal responsibility."

Judged by these scientific but conservative standards, Taylor could not be regarded as responsible.

Let me look at this question of responsibility from another aspect, It has been said that this man, Taylor, must not be allowed to escape the death penalty because of the effect such escape might have on prison discipline. Practically,

¹ Wharton and Stille's "Treatise on Medical Jurisprudence."

it is asserted that he should be hanged, sane or insane, as an example and warning to the other convicts in the Penitentiary. This brings us face to face with the question, whether a different measure of responsibility, and therefore of punishment, should be meted out to an insane prisoner, from that which would be considered just for a lunatic outside of prison walls. Shall Taylor, a convict without family or friends, who has committed a crime because of his delusional state, be made to undergo capital punishment, while another of distinguished ancestry and connections, but equally and similarly insane, is permitted to go free without a murmur? It is not the way I read the law, or interpret its spirit. The very fact that the system of separate and solitary confinement which the State has compelled him to undergo has probably had something to do with producing the insanity of the convict, would rather, if such a thing were possible, lessen his responsibility. The question of responsibility must be always decided simply and solely upon its merits. If it is a monstrous thing to hang an insane and irresponsible man for a crime committed outside of prison walls, it is equally a monstrous thing to hang him for a crime within those walls, and no utilitarian sophistry, or appeal to passion and prejudice, can make it any thing else.

ABSURDITIES OF THE LAW AS ILLUSTRATED IN THE TAYLOR CASE.*

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THE absurdity of our laws and judicial procedures that relate to insanity and expert testimony is a theme so trite, and the hope of amendment of these laws seems so slight, that an apology is demanded for re-exciting their discussion. Yet it is possible that the granite-like conservatism which entombs the legislative and judicial mind may, by continual dropping, be so worn through as to let in the light, and the world at last discover that the brain within is not as stupid as it has seemed.

Therefore do I venture to call attention to certain episodes in the late trial of the convict Taylor for murder, before Judge Ludlow, of our criminal court.

As it is affirmed that, in the course of a long service on the bench, Judge Ludlow has never had a decision reversed, he must be looked upon as a strikingly correct exponent of the law, and any lack of consistency and common-sense found in his decisions must be attributed to the law itself and not to the conduit through which the legal stream flows to the consumer.

Further, I wish to be distinctly understood that no reflec-

* A paper read before the Medical Jurisprudence Society of Philadelphia, November 11, 1884. This paper appears also in *The American* for Nov. 15, 1884.

tion is cast upon the penitentiary physician, who did not put himself forward, but was, as it were, thrust into the witness-box by the prison authorities and the officers of the Commonwealth. When Dr. Robinson was asked as to the mental condition of the prisoner he was at once challenged by the defence, and it was proved beyond cavil that he was legally disqualified by reason of lack of experience from signing a simple certificate of insanity, but after discussion it was ruled that he could give an opinion upon the witness-stand. The law of Pennsylvania must therefore be understood as saying: You have not had enough experience to sign a certificate of insanity that shall confine temporarily a maniac in a comfortable insane asylum, but you have had enough experience and do know enough to give an opinion that may put a man in the grave from which there is no return.

The importance to the prisoner of this admission of Dr. Robinson's testimony is apparent, when it is known that it was the only shred of evidence approaching that of an expert which was given in favor of the sanity of the prisoner; the medical gentleman who was employed to aid in the cross-examination of the defendant's experts being convinced in the court that the prisoner was insane, and declining to testify to the contrary.

The peculiarity of the whole procedure is further apparent when it is also borne in mind that the three medical experts who pronounced the prisoner insane were, in fact, employed and paid by the Commonwealth, although in theory they were in the service of the prisoner. The Commonwealth may be said to have selected three gentlemen of recognized position as alienists, and when these men became convinced of the insanity of the prisoner, to have overthrown their judgment by appeals to the prejudices and ignorance of the jury, aided by the testimony of a very excellent but inexperienced young physician. The pecuniary interests of the

three experts drew them toward a verdict of sanity, and it is absurd even to suppose that sympathy moved them in favor of the wild beast whose life with its seventeen ferocious assaults had been almost a saturnalia of an only half-frustrated bloodshed. The experts were bound by their oaths, and as the tiger-like beast before them appeared to be an insane man, could only say that he was insane.

The decisions and acts of Judge Ludlow's court in regard to medical experts illustrate a practice which has had much to do with the present low condition of expert testimony in this country. So far as medical questions are concerned the fault and the consequent disgrace lie not with the proper qualified experts but with the practice adopted by judges of admitting any one to the stand who will put himself forward, however ignorant he may be. The law has taken away from the medical profession all control over its own membership and its own government. It has handed it, helplessly bound, over to the medical colleges; institutions without responsibility, from whose secret examinations all light of publicity is shut out; institutions which directly derive large revenues by letting loose upon the profession uneducated men. In the eyes of the courts these men are all experts, to the play of whose ignorant fancy human property, liberty, and life are left almost unprotected. There are cases of mental disease lying in the borderland between sanity and insanity, concerning which there must always be a difference of opinion. But omitting such cases, I have never personally known any serious divergence of opinions in medical jurisprudence which did not grow out of the ignorance or incompetence of one of the two sets of experts. In the first trial I was ever in—the Schoeppe case—the experts of the prosecution were grossly ignorant of the medico-legal matters. One of the best of them swore that Miss Steinicke must have died from a compound

poison, because he had given to a hawk a little of every medicine that he had in his drug store and the bird had died with symptoms like those of Miss Steinicke. From this incompetency arose two expensive trials and a final probable miscarriage of justice. In the notorious Wharton trials, the weeds of testimony, the wranglings of experts, the final impossibility of proving either guilt or innocence, were caused by the incompetence of the chemist employed by the Commonwealth. A qualified legal analyst would have settled the matter at once.

In the Wood trial, cited by the District-Attorney at my recent cross-examination, the family of the injured man very naturally desired punishment for the aggressor, and consequently paid for competent experts, who were nominally employed by the Commonwealth, the trial being a criminal one. When the rebuttal was attempted it was found that these experts had been convinced by us that the prisoner was really insane, and refused to testify otherwise. The case was then abandoned.

In the great Dwight life-insurance case, the plaintiff's experts came, it was stated, prepared to testify that Colonel Dwight died of malaria or other natural diseases; yet, as to all essential points, they were silenced before going on the stand, and there was no important contradiction of experts in matters of opinion. This result was the more remarkable, as with one or two exceptions the plaintiff's experts were not entitled to act as such.

In this way I could enumerate trial after trial, but time is wanting.

The science of medical jurisprudence is strong in its certainties, and the contradictions of witnesses almost always arise from the incompetency of one or the other side.

Very rarely does the student in this country study medical jurisprudence at all; and only when called upon in after-

life, suddenly, it may be, does he open a work upon that science. When it is further borne in mind that a considerable proportion of the American medical profession has never had any proper education, even in the practice of medicine, it is plain that so long as the courts cling to the fallacy that a doctor is a doctor, so long will reign confusion and contradiction between those who know and those who don't know. It is inevitable that as long as the law fills the medical profession, as it now does, and recognizes all upon an equality in the court-rooms, there will be doctors in abundance whose venality opens them to purchase, or whose ignorant credulity makes them liable to imposition.

The present system works ill both ways—in convicting the crazy man and in liberating the sane murderer. In the case of Emma Bickel, over which the newspapers are now making merry, or are growing furiously sarcastic, at the assumed expense of experts, but one physician testified as to the prisoner's insanity—and he not an alienist at all, but a general medical practitioner! I happened to know that one qualified alienist was approached by the defence and refused to testify, because he could see no evidences of insanity.

Trials involving the question of insanity are fast becoming such a farce in this country, that he who sees them as they are, hardly knows whether to laugh or to cry; but it is the judicial and legislative professions, not the qualified experts, which are chiefly at fault.

Experts are almost as much a necessity in a court of justice as the judge himself, yet our customs are stripping their testimony of almost all its value. To laugh at them, to worry out and get ahead of them in the battle of wits—which is dignified by courts as a cross-examination—is much of the business of the modern attorney.

Some time since I was asked for an opinion in regard to

a certain man's insanity. After examination I said to his lawyers: "You cannot find a qualified honest man in the world who will testify to your client's insanity; but if you will call no one, abuse those who tell the truth about him, and ridicule expert testimony in general, you will win your case." The plan was adopted; the judge delivered an opinion applauded by the newspapers as full of wisdom, but known by educated alienists to be lacking just where strength was most necessary, and the client was pronounced sane. Fortunately, after a few weeks or months' liberty, he had more wisdom left in the wreck of his intellect than the Court had in the plentitude of its self-satisfaction, and, for the protection of himself and friends from his insanity, voluntarily returned to an insane asylum, where I believe he now is.

The most forcible illustration furnished by the Taylor case of the lack of consistency and common-sense in the law is, however, contained in the following questions and replies, which are given as they stand upon the court record:

Q. (by the Court).—An eminent physician has said that the law is defective, because it leaves out of account the moral features of one's nature, and therefore does not recognize the sentiments of passion and emotion. Is not the existence of anger, revenge, and jealousy the product of a diseased brain?

A. (by Dr. Wood).—It may or may not be. I believe a portion of the brain is set apart for the intellectual sphere, and another part for the emotions.

Q.—Suppose a case to arise in which the diseased condition of the brain produces jealousy, anger, or revenge; is that man insane?

A.—Yes.

By the Court :—That is the sort of insanity the Supreme Court declares shall make a man responsible.

I ask that special attention be given to the wording of the questions. The controversy is not the old one as to whether there is such a thing as moral insanity distinct from intellectual insanity. The judge puts it squarely and fairly that the passion is caused by disease of the brain, and by such disease alone. As the victim has no control over his disease, it is plain that he has none over the passion ; but, although the absurdity of such law is self-luminous, the subject is one of such vital importance that I propose to discuss it in some detail.

The nervous system of man has for its powers or functions : will, which controls all actions ; intellectual powers, which guide the will ; emotions, which also influence the will, and are capable of calling into activity the powers of the body independently of the will ; and motor discharge, which causes muscular movements. Perhaps this will be more easily understood when function is connected with structure. The nervous system, for our present purpose, may be considered to be composed of four superimposed zones, corresponding to the four functions spoken of above, and arranged in the order of their subordination. First, at the top, is the zone of the will, which in the normal man dominates all below it. Second, is the intellectual zone, which furnishes the intellectual actions. Third, is the emotional zone, which can act upon the lowest zone, but is itself controlled by the will. Fourth, is the lowest or spinal zone, which causes muscular movements when called upon by superior zones. Such is the human organism to which the law is supposed to be correlated.

The basis of all proper laws must be either abstract justice, or necessity for the protection of society ; as equivalent terms to abstract justice may be used the expression "moral equity," whilst "public policy" may be employed as a brief equivalent to the necessity for the protection of society.

The demented criminal is justly held by the law as irresponsible, because his intellectual faculties cannot distinguish right from wrong, and therefore his will cannot select between the two courses of action. This is a recognition by the law of the moral equity of the case, but in order to protect society the man is locked up, although moral equity does not demand his incarceration. It can make no difference in the moral equities what is the immediate method or cause of the loss of the alleged criminal's free will. If the will itself be paralyzed by disease, the individual, so far as his moral rights are concerned, is in the same position as though the will had power but could not act properly on account of the perversion of the intellect. Again, if there be disease in the lower or spinal nerve zone then the individual is freed from legal as well as moral responsibility, so far as concerns the muscles immediately affected by such disease. Thus, if in any situation duty require a man to put forth his hand, if the arm be paralyzed by disease in the special zone or region, the man is freed from responsibility, because he has no free will in the matter, the possibility of his action being estopped. Again, if the disease of the spine cause an uncontrollable spasm of a man's arm, and disaster results from such movement, the man is still free from responsibility.

It is the office of the will to control the passions by preventing a discharge of nerve-force from the zone or region whose function they are. The same morbid process which, when attacking the spinal cord causes a discharge of nerve-force and a consequent spasm of the muscles, may so attack the portions of the nervous system controlling the passions, that the will has no more power over the discharge of nerve-force from these emotion-centres than it had over the discharge of the spinal nerve-force that caused movement of the arm in our supposititious case. The free will is paralyzed

in either case, because disease has so affected a lower nerve-centre that said nerve-centre will not mind the behests of the will. A man's free will being in any way destroyed, the equity must be that the individual is relieved from responsibility. If we look at the subject anatomically the absurdity of the law becomes even more apparent. The four zones of nerve-centres may be with sufficient correctness considered as placed one above the other; at the bottom is the spinal system, above the emotional, above this the intellectual, and higher than all the will-zone. Now the law appears to be that, if a tumor, inflammation, or other lesion affects the spinal zone so that the will cannot control its discharges of nerve-force, the individual is not responsible for results which grow out of such loss of control; if the intellectual zone be damaged, the same rule of law applies; if the will-zone be affected, again is the individual freed from responsibility; but if the tumor or inflammation locates itself in the emotional zone, then must the man be hung for acts which are entirely beyond his control and are the product of physical disease. A fraction of an inch one side or the other in the situation of a disease of the nervous system makes the difference whether the sufferer is to be taken care of for life or is to be hung.

Suppose two brothers, John and James, inherit a tendency to a nervous organic affection which we may call X. Then if John has his X a half inch higher up in the brain than has James, he is comfortably housed and fed, whilst his brother perishes on the gallows.

The complete *reductio ad absurdum* is, however, to be found in the single case: Suppose a man has a shifting, nervous irritation. If to-day such irritation paralyzes the intellectual centres, the man is irresponsible; but to-morrow, when the irritation shifts to the emotional centres, the man is responsible, although in either case equally helpless against his diseased self.

I have no mawkish sympathy with criminals. I believe that every man who is convicted three times of a felony should be confined for life and made to support himself by labor. I recognize that society has the right to take human life, when such taking is absolutely essential for the protection of society, whether abstract justice warrants the sacrifice or not. I do not complain simply because the law unjustly takes the life of the insane man. Death to the hopelessly insane is often a boon, a rest, and is never a distinct evil. The deep damnation of the statute is in that it publicly brands the unfortunate victim, in his helplessness, with the mark of Cain, and, if he have a family, shadows the lives of those he leaves behind with perpetual infamy. If the protection of society demands that the insane murderer be put to death, let such death be as painless and as far free as possible from the horror of expectation, and let it be distinctly stated by the judge: "This man, though guiltless, because irresponsible, is to be put to death for the protection of society." Beyond all is it important that the law be consistent with itself, so that the growing feeling of distrust of, and contempt for, our courts may not ripen into quiet lawlessness, and fraud be habitually met by fraud through the hopelessness of an appeal to the courts.

NEW YORK NEUROLOGICAL SOCIETY.

Annual Meeting.

The annual meeting of the New York Neurological Society was held Tuesday evening, April 1st, the President, Dr. WILLIAM J. MORTON, in the chair. The following officers were elected for the ensuing year:

President, Dr. W. J. Morton; 1st Vice-President, Dr. C. L. Dana; 2d Vice-President, Dr. G. W. Jacoby; Recording Secretary, Dr. E. C. Wendt; Corresponding Secretary, Dr. W. M. Leszynsky; Treasurer, Dr. E. C. Harwood; Council: Drs. Graham Hammond, E. C. Seguin, L. Weber, G. W. Jacoby, W. R. Birdsall.

Stated Meeting, May 6, 1884.

The meeting was opened by the following remarks of the newly elected President:

Gentlemen of the New York Neurological Society: A year has passed since you elected me to preside over your proceedings. Now again for another year I enter upon the well-trodden pathway, strengthened by your continued confidence and by the experience gained.

The year of neurological work in this Society just passed has, I am sure, been one of mental profit and progress to all of us. We have listened to excellent papers; we have examined interesting cases; we have heard discussions which have unearthed the experience of expert students; and we have felt that inspiration that arises from the harmonious movement of numbers in pursuit of a common goal. And never before in the history of the Society have its proceedings been so widely published.

Time has swept over our ranks with a light and forbearing hand. Individually, age has touched us lightly. Sickness and death have held aloof from us.

Corporately, a large infusion of new and good blood has been injected into our veins, as indicated by our lengthening roll of active members. Our veteran readers of papers have not fallen wearied by the wayside, but still visit our halls and watch younger aspirants in their ascent to their expected niches in the medical temple. Our polemical disputants have softened with years and experience.

In short, peace, harmony, contentment, and a spirit of earnest work are now our characteristics.

Never has this Society been in better condition for its work than to-night. Will you not, then, gentlemen, catch the inspiration of our situation and come forward during the year with contributions that do credit to you individually and to us collectively?

But I will not further occupy your attention. At our last June meeting I read a somewhat lengthy address. At this meeting I should feel a strong misgiving in occupying your time in a similar manner. I need, then, make no apologies for proceeding directly to the further work of the evening, thanking you for the honor conferred, and asking you to continue to give your attention to the work of this Neurological Society, and to sustain with your best and most loyal efforts its already high fame.

Dr. HENRY D. CHAPIN exhibited two cases of lead paralysis in children, with descriptive remarks.

Dr. MORTON then exhibited a case of local lowered temperature, viz.: an adult patient with a permanently cold hand. The patient gave briefly the following history of his condition:

Some time during the month of June I was obliged to go to St. Luke's Hospital, suffering indescribable agonies. The doctors pronounced my disease a case of spinal meningitis.

I was discharged about the first of August, 1879, and since then have been suffering with this cold hand. I do not remember how soon after this discharge that I first felt the coldness, but I have always had the impression that it resulted from my sickness.

The coldness begins about at the centre of the back of the

(right) hand, creeping gradually to the ends of the fingers and up the arm to the elbow, unless arrested by rubbing or submitting to heat. I have never observed that it would go up farther than the elbow. I have often been greatly annoyed during the winter, in a room heated to over 75 degrees, and have been obliged to hold the hand either close to the stove or in my pocket. During the coldness the hand presents no external indications, either in color or otherwise, that it is cold, nor has its strength, at any time, been diminished, nor its sensitiveness impaired.

As to treatment, I have tried every thing that has come in my way: Manipulation, rubbing, external applications of various kinds, medicines, galvanic and static electricity, until the administrators were satisfied as to its utility; once I was cupped over the spinal column, once blistered, three times cauterized at the same place. The last thing tried by Dr. Morton was the placing of the hand in a vacuum. None of all these various applications have produced the slightest effects, either in making the hand better or worse.

Dr. MORTON asked for suggestions from members of the Society as to treatment. Thermometric tests sustained the patient's allegation that the hand was colder than the opposite. A difference of 1° Fahr. was established.

Dr. MORTON then exhibited a case of morbid somnolence. The patient, a physician, gave the following account of himself:

G. P. S., aged thirty-two; American physician. About fifteen years ago went through a period of several hours of severe physical exertion, in response to a challenge. At its finish I was extremely fatigued, so much so that I fell from sheer exhaustion, and for several days did not recover my usual vigor.

Coupled with this exhaustion was a mental and nervous condition somewhat peculiar. For a period of two weeks (as near as memory serves me) I was not conscious of waking from a sound sleep, *i. e.*, I spent most of the nights awake, occasionally for a short time only falling into a state of dreamy mental activity bordering upon waking—never really losing consciousness. My thoughts would take the most fantastic and incongruous forms. My waking thoughts daily became more strange and inconsistent. I at first looked upon these thoughts with a certain degree of suspicion, but as they continued to force themselves upon me they began to appear possible, and finally natural. I knew my thoughts

and beliefs were different from those of others, and believed them wrong and myself right ; but I hesitated to express myself, for I knew I would be (as I had been) ridiculed. This ridicule did not in the least cause me to doubt the correctness of my views—it only made them the more fixed. I did not, as one might think, believe those who differed from me to be insane. I believed that I was simply “advanced” in thought, and that my ideas would, when they were matured, at first startle the world and finally be universally believed. Of course I was insane, and profoundly so, as I now perceive ; this condition of mind becoming less marked as days and weeks went by, so that finally after a lapse of three or four weeks it had passed entirely.

Whether this fatigue and consequent state had to do with my subsequent history I know not ; certainly before that had taken place I had never been annoyed by the inordinate sleepiness which now troubles me.

Not many months after the above-mentioned occurrence I began the study of medicine, and it was during the lecture hours that I was first troubled with my inability to keep awake. During the three years of my attendance upon medical lectures I do not think there was a single day when I did not at least once during the lectures either go soundly asleep or pass into a state of semi-unconsciousness, in which, although I heard what was going on, I did not understand it. In my reading also I was annoyed by it. I found that the reading of any work, medical or not, which required thought or mental exertion to any extent, would almost invariably, after the lapse of an hour or two, cause me to fall asleep. This condition of things has grown steadily worse, until now I seldom can read more than half an hour—often not longer than fifteen minutes—without falling asleep. If I attempt to resist this inclination I invariably cause a severe frontal and occipital headache which will last for the remainder of the day. I would often, thinking it might be only a mental habit which could be broken by opposition, fight against this sleepiness for hours, succeeding only in preventing myself from going soundly asleep ; but going into a condition [although reading (?)] in which I could not understand what I was reading, from which I could be easily aroused by a slight unusual noise, but from which I could not arouse myself by any effort of my will. These attempts to master this inclination always signally failed, and I am absolutely certain that it is not possible for me to overcome this tendency by any pure mental effort. Throughout the daytime (*i. e.*, after breakfast) the

reading of any book of a light nature, as a novel, for a moderate length of time, would not cause me any feeling of sleepiness ; but the reading of any print before breakfast, even to the amount of ten lines of the morning paper, would give me a severe headache, which would last for hours—perhaps all day ; so that for many months I have not dared to look at print before breakfast.

During the time I was studying medicine (now over eleven years ago), and to some extent for a few succeeding years, when it was rather more necessary (?) than now that I should do a certain amount of reading, this headache was quite a usual occurrence, so that for a period of years I was never during my waking hours free from it. During later years I have not suffered so much from the headache ; but for the simple reason that I do very little reading—often passing a week without reading fifty lines of print,—although the morbid condition has grown steadily worse, for the headache and sleepiness supervene more promptly than they did two years ago.

I look upon this “sleepiness” as simply cerebral exhaustion, for it is associated with a pure physical exhaustion. This physical exhaustion I feel upon slight exertion, as going up a single flight of stairs.

I am troubled occasionally (perhaps three or four times a month—although a few years ago it was two or three times a week) with nocturnal emissions and weeping penis, and always after these occurrences my symptoms of physical and mental weakness are worse.

The symptoms of physical fatigue I can control to some extent, but the mental giving out is at times beyond my control. I have gone to sleep while making a vaginal examination in case of labor. Three times during the writing of a single prescription I have nodded off in a momentary doze. I have gone to sleep in a dental chair while the pounding of gold-filling was going on.

The disposition to sleep is not the only unpleasant feature of my case, for even when awake I am not at all times able to direct my mental operations. I feel mentally just as I would physically if I attempted to lift a weight which I am utterly unable to move. I make the mental effort and feel the discharge of nerve force—the steam is turned on, but there is either too much friction or not enough steam, for the mental machinery will not budge. I feel the necessity of saying something, and (if I am conversing with a patient, for instance) so the automatic brain-centres will come to the rescue and I will perhaps ask a question which I have already

asked and had answered, or make a stereotyped remark which I have made or heard made hundreds of times before,—do something, in other words, which does not call for cerebration. This condition of mental lethargy will last for hours—usually until the next meal.

Any mental excitement, as a slight exhibition of anger, will unstring me for hours. It is usually difficult to make me angry or out of patience ; but I think my self-restraint in this regard is owing to mental discipline, for at times I am utterly unable (when taken off my guard) to control my temper.

The above condition of things has led to certain mental habits which are, to say the least, very annoying. I have naturally lost my fondness for reading. I cannot read medical or other scientific works—I will not any thing of a light nature. I have a feeling toward mental exercise of all sorts which amounts, at times, to a dread ; hence I have acquired a habit of postponing the settling of a question or coming to a determination in a matter requiring thought primarily and secondarily,—and of all other matters, even sometimes of a trivial nature.

Although I am never “sick ” I never feel very well and frequently feel life a burden.

After discussion of these two cases, Dr. E. C. WENDT related the history of a case of unilateral spasm of the tongue, occurring in a man of good habits and healthy antecedents. There was not the slightest indication of neuropathic taint. The patient, having faithfully used a variety of drugs, was finally cured by a daily application of galvanism to the affected side of the tongue.

The Society then adjourned.

Stated Meeting, June 3, 1884.

Dr. Wm. J. MORTON, President, in the chair. In the absence of the Secretary, the President appointed Dr. C. L. DANA Secretary *pro tem*.

The paper of the evening was read by Dr. F. C. FULLER and was entitled : “Contribution to Cranial Cerebral Localization Illustrated by Cases of Trephining.”

The cases cited were four in number, and had been under Dr. Fuller's care in Bellevue Hospital. All were fractures of the skull, with depression, the injury being located over

the motor area of the brain, and the symptoms were in exact correspondence with the commonly accepted theories of cerebral localization.

Analogous cases to those included in the paper were cited, and a *résumé* of instructive cases given. Emphasis was made of the superiority of the strict antiseptic method of treating head injuries over the old method, suturing of the flaps and the obtaining of primary union being the desideratum.

Stated Meeting, October 7, 1884.

W. J. MORTON, M.D., President, in the chair.

Dr. L. WEBER read a paper "On the Nervous Origin of Some Disorders of the Alimentary Canal."

Dr. E. C. SEGUIN, in opening the discussion, said that the disorders alluded to in the paper just read were far from uncommon. It must often prove quite difficult, however, to reach a positive diagnosis. The abdominal symptoms were by no means so characteristic and well-defined that a clear case could readily be made out. It was to be remembered that dyspepsia, pure and simple, was frequently accompanied by a variety of morbid nervous manifestations. In this country especially, where we had both many dyspeptics and numerous neurotics, a differential diagnosis would not always be possible. In this connection he also alluded to the fact that the ordinary American diet and cookery predisposed to gastro-intestinal fermentation. He thought that repeated physical examinations at different periods, even of the same day, might aid in putting a diagnosis on a firmer basis. It was important in all cases to separate subjective sensations from true objective symptoms. The discovery of the tender pressure-points was new to him. He failed to see how hyperæsthesia of the deep-seated abdominal nerveplexuses could be discovered through palpation. As regarded treatment, he was of opinion that it should be in the first place tentative. From his own experience he was inclined to place more value upon a general tonic *régime* than upon direct and local medication.

Dr. LESZYNSKY inquired whether Dr. Weber's patients

were also sufferers from migraine, and on being answered in the affirmative as regarded two women, he said that Clifford Allbutt, in the recently delivered Gulstonian Lectures, had laid stress on the frequent association of these evils.

Dr. DANA stated that he had failed to find evidence of hyperæsthesia of abdominal ganglia, especially of the gastric plexus, in cases of this kind. In his patients, who were generally quite thin, Dr. Seguin's objections touching the possibility of deciding as to the presence of this symptom by palpation had not been found to hold good. He had been able to explore the abdomen in its deeper parts very thoroughly in his cases. He pointed out that fermentative dyspepsia might accompany, as an independent affection, various neurotic disturbances, and cited a case forcibly illustrating such a condition. In the treatment of neurotics suffering with pronounced gastric disturbances he had found mountain air beneficial.

Dr. PUTNAM-JACOBI thought that one important diagnostic point had been overlooked—namely, the relation of the onset of the paroxysm of pain to the time of eating. In purely nervous dyspepsia, say of reflex ovarian or uterine origin, the symptoms of gastric distress were at their maximum during the hours of fasting, and relief might be procured by the ingestion of food. In fermentative dyspepsia, on the other hand, the introduction of food into the stomach would only aggravate existing symptoms. Moreover, pain occurred from one half to two hours after a meal. Besides this, the acid eructations, the coated tongue, the bad taste in the mouth at morning, should make differential diagnosis comparatively easy. In nervous dyspepsia the tongue was remarkably clean. During, or even before a paroxysm of pain, nausea was not observed.

Two marked cases of neurotic dyspepsia had fallen under her observation some time ago. The first concerned a lady, sixty years of age, who, soon after having come under the influence of London's foggy weather, developed two neuroses. The first was spiritualism; and the second, violent paroxysmal gastralgia. Six eminent London physicians decided that she was afflicted with cancer. But Italian sun-

shine quickly cured her. The second case was that of a man who, after the loss of a loved child, became much depressed in spirits, and was afflicted with gastralgic attacks. For months he grew progressively worse, losing flesh all the time. He was eventually completely cured by arsenic. Another case had been cured by the faradic current. She thought that it was more difficult to distinguish moderate degrees of glandular atrophy of the stomach from neurotic disorders, than to separate the latter from fermentative dyspepsia.

Dr. H. D. CHAPIN believed that the nervous manifestations were often secondary to acid fermentative processes, set up by the excessive consumption of starchy foods.

Dr. E. C. WENDT remarked that it was quite evident from the drift of the present discussion, as well as from similar debates in foreign societies, that the entire subject was still involved in considerable obscurity. One thing was certain, however,—namely, that the profession in all civilized countries was beginning to reinstate the nervous system, in its relation to disease-development, into a formerly occupied position of pre-eminence. Not many years ago the pathological school had been so exclusively dominant that functional disorders had been almost relegated to the limbo of the mythical. Within the past few years, however, a great change had set in, and at present there seemed to be, if any thing, a danger of falling into the other extreme. Certain it was that to-day there either was much less gastrointestinal catarrh, or else it was more frequently overlooked than formerly ; while on the other hand nervous dyspepsia must either be of much more frequent occurrence, or else be erroneously assumed to exist in true structural disease of the alimentary canal. Clifford Allbutt had, in the recently delivered Gulstonian Lectures, drawn some vivid pictures of this class of cases, and the whole subject had been but lately discussed at the third German Congress of Internal Medicine. At that meeting Leube had reiterated his former well-known views on nervous dyspepsia. But he had been opposed by several competent observers, prominent among whom was Ewald. The latter took the ground that real disease of the stomach might start the entire train

of nervous symptoms so often seen in neurotics. Trousseau's *vertige stomacale*, dyspeptic migraine, and Rosenbach's cases of vagus neurosis were some of the rarer manifestations belonging to this category. Ewald further asserted that Leube's well-known *Verdaunungsversuch* had no great practical value, for he had in many instances found food-particles in the water used for washing out the stomach seven hours after a simple meal. So also he had found the gastric fluid in positive structural disease, such as cancer and chronic catarrh, to give normal chemical reactions. Dr. Wendt thought it was quite evident from all this that we still lacked decidedly characteristic or pathognomonic symptoms of this class of disorders. It should never be forgotten that dyspepsia was not a disease in itself, but might be a symptom of very many vastly dissimilar affections. To the presence or absence of painful pressure-points, supposed by Burckart to be characteristic of nervous dyspepsia, he had not, from his own experience, learned to attach any significance. He also thought that the term gastric neurasthenia, suggested by Burckart, was not a happy selection. Such cases should be classified rather under the general heading of "nervous disorders of the alimentary canal." One point he wished, however, to emphasize—namely, that nervous dyspepsia did not kill. He had seen such patients apparently brought to the very door of death, but in the end they had invariably recovered. One case he remembered in particular, that was almost the exact counterpart of the first case mentioned by Dr. Jacobi. Here, too, eminent physicians had been misled, probably by the cachectic appearance of the patient, to diagnosticate gastric cancer. But the lady in question fully recovered, and at present, six years after she had been given up, she was better, stronger, and weighed more than at any other period of her life that she could recollect. Finally, as regarded treatment, he thought that general and hygienic measures were more calculated to benefit sufferers of this class than drugs. Absolute rest was at times imperative. Of drugs he thought arsenic was the best for the intervals, and morphine subcutaneously or in suppositories for paroxysmal pain.

Dr. MORTON alluded to the ready supervention of diarrhœa through emotional disturbances in neurasthenics. Animals under excitement often showed similar symptoms, but he did not wish to infer for this reason that they too were afflicted with neuroses.

Dr. TEED, of Kansas City, raised the query whether we were not painting old facts in new colors. He believed that all the troubles mentioned in the paper and the discussion could be included under the old designation of atonic dyspepsia. His explanation of the origin of these disturbances was as follows: nervous influence that should be sent to the stomach became diverted into other channels, and as a consequence the gastric glands failed to perform their function. Besides this, nerve stimulation might happen in the stomach, be thence transmitted to the central nerve-organs, and once more reflected back upon the stomach. Ingestion might in this way lead to watery secretion and thus result in copious evacuations. But the neurotic taint might manifest its existence through other organs besides the stomach. Cardiac palpitation might occur. The latter might even coexist with gastric distress and yet the consummation of digestion be neither retarded nor in any other way disturbed.

The great point to know was, where did all the nerve-force come from? How did it originate in the body? In his opinion it ultimately depended entirely upon oxidation or some similar chemical change constantly taking place in organized beings. He thought that the various cells of the body might be likened to minute electric batteries that were perpetually active. Through their agency force was liberated which primarily assumed the form of heat. In this way currents were normally sent to the brain and again started out from the encephalon to other parts.

Of course, if the paths of conduction became altered failure of force-transmission must result. This gave rise to morbid symptoms which we must endeavor to interpret. He also compared the relations of the cerebro-spinal with the sympathetic nervous system to the two wires of a battery. One thing was certain, namely, that new matter or new force had no existence in the human body. The

same physical laws that governed the outer world also held good for our bodies. It was essential, therefore, to know well the rules and laws of the transmission and radiation of force in the outer world before we could hope to understand the actual condition of nerve-action within us.

Dr. WEBER, in closing the discussion, said that he agreed with Dr. Seguin in the importance which he attached to a thorough examination of cases of dyspepsia of whatever nature, particularly as to the presence of dilatation, but believed that dilatation was not only liable to occur when patients indulged in too liberal quantities of farinaceous food and sweets, but also by the vicious habit which many people, young and old, had of putting much more food into their stomachs at a given meal than the organ ought to receive at one time. Like Dr. Dana, he had not been able thus far to verify Dr. Burckart's experiences as to the tenderness of one or more of the abdominal sympathetic ganglia in certain cases of gastric neurasthenia.

The good results which Dr. Putnam-Jacobi and others had seen from small doses of arsenic in the management of these disorders he was ready to accept as an illustration of rational therapeutics. He had himself seen excellent results from drop-doses of Fowler's solution, taken on an empty stomach, in the early morning retching and vomiting of habitual toppers. He believed that Dr. Wendt was right when he said that Dr. Burckart's designation of "neurasthenia gastrica" was not happily chosen, and that the general name of "nervous disorders" would be better.

Dr. WILLIAM BROWNING, of Brooklyn, read a paper illustrating "Pseudo-bulbar Paralysis."

Dr. E. C. SEGUIN related a case of bulbar disease which, if not quite germane to the present subject, was intrinsically so interesting as to merit the notice of the Society.

Male, forty-four years of age, seen January 31, 1876, in consultation with Dr. M. J. Moses. Denies syphilis or recent sore-throat. Well up to January 1st, when he had epileptiform attacks limited to the limbs of the left side; in one attack the tongue was bitten. No recurrence of attacks. Subsequently severe right supra-orbital neuralgia cured by arsenic. On January 29th sudden inability to

swallow solids developed in four or five hours. Examination shows a spasm (?) two inches below pharynx. The voice is nasal, and articulation is imperfect. Patient is conscious of the labor of speaking.

In view of the rapid development of the symptoms, I expressed the opinion that the case was not one of true bulbar paralysis of the progressive form, but an acute paralysis due perhaps to an ignored diphtheria, and that the prognosis was not quite hopeless.

On February 7th, nine days after the appearance of dysphagia, Dr. Moses sent the patient back to me with the following letter :

"MY DEAR DOCTOR :—I asked Mr. S—— to call upon you and deliver this note, which for obvious reasons I send sealed. I am afraid he shows more progressive symptoms than when you last saw him, and that the prognosis made now would not be quite as favorable. I think it will be necessary to put you in possession of all that has happened since last Monday, when you first saw him.

"On Monday evening he lost the power of swallowing fluids, and I passed a stomach-tube, but it produced such irritation that he almost suffocated from spasm of the glottis when the tube was in his stomach. I passed the tube several times, but each time was forced to withdraw it to avoid a catastrophe. I finally hit upon an idea which I congratulate myself and the patient upon. Having learned from previous examination that the middle and lower muscles of constriction were not as much involved, I made my patient lie down and permit the mouthful of fluid to flow down below the edge of the velum, and *then* to swallow. This effort raised the larynx, and propelled the fluid within the grasp of the lower constrictors. By this device (lying down at each mouthful, with the head thrown far back) Mr. S—— was able to take sufficient nourishment, milk, eggs, and beef-tea, and his medicine, viz., quinine, iron, and strychnia in solution during yesterday and Wednesday.

"On Tuesday, by violent effort, he was enabled to swallow sitting up, but at the same time I noticed marked loss of power in the muscles of the cheeks and lips, and an aggravation of his nasal speech. I noticed also, steadily progressing, an irritation of the pneumogastrics, evinced by violent, prolonged, and characteristic cough. The irritation is almost constant, touching the throat with an electrode or the effort of swallowing bringing on a most violent paroxysm. I have faradized the muscles of the pharynx

with a gently increased current, and galvanized the spinal accessory and glosso-pharyngeal with from four to six cells of Kidder's eighteen-cell battery. At first each was well borne, but yesterday a very mild current from either battery provoked vomiting, and on passing a current from six cells over the pneumogastric, I provoked a prolonged and almost exhaustive cough. I am afraid the disease is progressive, and due to central lesion. I send him to you for another examination, that you may compare his present condition with the result of your examination last Monday, and see if some new points may not have arisen to point to you a separation of the two theories then presenting, viz., labio-glosso-pharyngeal, or diphtheritic paralysis."

Examination: Speech not as good; whistling is possible, but feeble; can't fill cheeks with air; much salivation; orbiculus oris weaker, but can still make O. The tongue moves well in all directions. Voice not as loud as at last note. Much cough (more morning and night). Throat very irritable. No facial palsy (apart from orbic and buccinator paresis). Voice very nasal, and articulation is impaired. In speech and by reflex action soft palate acts well. Fails to swallow a morsel of bread, and the laryngoscopic mirror shows it lying behind the glottis a little to the left. Rima glottidis red; vocal cords not seen. No anæsthesia of face or hands; no hemiplegia.

It should be added that two years ago patient had neuralgia of the left side of the face and paralysis of the left vocal cord. Again denies syphilis. I adhered to my diagnosis of acute non-progressive bulbar paralysis, and advised continuing the iron and strychnia and using weak galvanism to back of neck and outside of throat. My notes are not complete, but I can state that the patient recovered somewhat slowly but completely in a few weeks.

Dr. MORTON alluded to two cases of hysterical simulation of bulbar disease that had been on the point of being reported as instances of progressive bulbar paralysis, when both recovered completely.

Dr. SEGUIN said that the converse mistake had once happened to him. It was a case which, owing to the absence, at the first visit, of labial symptoms and the predominance of palatal disturbance, was held to be not a genuine instance of progressive bulbar disease. At the second visit, however, difficulty of swallowing and other signs left no doubt as to the true nature of the affection.

PHILADELPHIA NEUROLOGICAL SOCIETY.

A stated meeting of the Society was held Monday evening, April 28th, the President, Dr. S. WEIR MITCHELL, in the chair.

Dr. J. HENDRIE LLOYD read a paper entitled "The Report of a Case of Pseudo-Hypertrophic Muscular Paralysis With Bone Lesions."

Sarah C., æt. seventeen, was one of the first inmates of the Home for Crippled Children, after its establishment by Mrs. Innes, in the early winter of 1883. The patient presented, when first seen, an appearance of great obesity. The fat was generally distributed to the face, neck, trunk, gluteal regions, arms (partial) and legs. Some of the muscles of the forearms were slightly wasted. The appearance was one of great robustness of health, and the accumulation of fat and general outlines of the figure were such as to suggest an over-fed, middle-aged woman, rather than a girl but half advanced in her teens. Upon closer inspection there was discoverable a strange contrast to this appearance of health. It could be readily seen, then, that the patient was a complete cripple. So absolute was the loss of power that she either lay supine or was propped with pillows in a large chair, the body spreading out, as it were, by the mere force of gravitation, and without muscular resiliency or the control of will-power.

The girl was, and now is, so helpless that it is impossible for her to assume the sitting from the reclining position ; she cannot turn upon her side without assistance, and it is with the greatest difficulty that as she lies upon her back she crosses one leg over the other. She retains, however, some power in her arms, especially the forearms, and although these regions are evidently wasting, they alone seem to possess what fraction of power the girl can command, and with them she can sew, crochet, and do other work requiring skill and training.

The details of her condition are briefly as follows :

The muscular system presents in many places marked enlargements. These are evident especially in the deltoid, lumbar muscles, and calf. The muscles in these regions have a dense, doughy feel, and are overlain with subcutaneous fat, with which they appear so intimately connected that it is difficult to detect their exact limitations. They are very little, if at all, subject to the will, so that their passive condition and their envelope of mottled and lifeless-looking skin are very suggestive, to one who handles them, of some profound pathological change.

This pathological change has been demonstrated by the microscope, and is in accord with the classical description of pseudohypertrophic muscular paralysis. With the aid of the little instrument of Dr. Harte, of this city, specimens of the muscular tissue were taken from the lumbar region and the calf. Dr. William E. Hughes kindly prepared these for examination, by teasing them, as the fragments were too small for embedding and cutting. The specimen from the calf presented under the lens an interstitial hyperplasia, with granular changes in the muscular fibre, and a marked loss of striation. There was not any appearance of secondary fatty change in the connective neoplasm, which may possibly be accounted for by the "teasing" process. The specimen from the lumbar region was not apparently from the muscle, but was simply adipose tissue.

The reactions to the faradic current in the deltoid and calf muscles are very feeble. The reactions with sponges on median and ulnar nerves of forearm—the muscles of which are wasting—are about normal, or, at least, much more active than in the hypertrophied muscles. So, too, in the peronei. The reactions of degeneration to the galvanic current have not as yet been sought for.

The girl was weighed some months after her admission to the Home, and after she had evidently lost much flesh, and turned the scale at 124 lbs. When first admitted it required the combined strength of two men to carry her up stairs, and she, no doubt, at that time weighed considerably more. Her stature is not tall, and her age at that time not seventeen. The measurements of her limbs are at present as follows :

UPPER EXTREMITIES.

Arm, right, $12\frac{1}{2}$; forearm, 9

Arm, left, 13 ; forearm, 9

LOWER EXTREMITIES.

Right thigh, 21 ; leg, $13\frac{1}{4}$

Left thigh, $21\frac{1}{4}$; leg, 13

These figures show an increase of bulk during the last few months. The girl's mind is fairly bright. She is something of a giggler—simpering and foolish,—but her defects may be partly, at least, accounted for by lack of opportunity and education. She cannot be called a feeble-minded child. The patient's history is very obscure. Her mother "ran away with another man," as her brother explains in a letter, and she has passed her life in public institutions. This brother says he thinks she was always a cripple, but not so bad but that she could at one time walk. Her general health is excellent; she attempts to add constantly to her exuberant proportions with a vigorous appetite, and is now putting on fat. The heart and lungs are normal. She occasionally suffers pain from the spinal curvature, to which reference will be made in a moment. There is no evidence of heredity. She at one time menstruated very freely, and as often as every two weeks.

But while the appearance of the muscles is so significant, there are changes in the bones of still greater interest, and to which I desire to call your attention. These changes have occurred in the spine, and in the elbow- and knee-joints. The spine is in a state of constant scoliosis, with its greater convexity to the right. One year ago, this convexity could be thrown to the left by one attendant lifting the patient by the shoulders, and another making pressure on the vertebræ. It would not remain thus, however, and was evidently uncomfortable to the girl.

The elbow-joint presents an unique appearance, which, as far as I am at present informed, has not been described in any other reported case of pseudo-hypertrophic muscular paralysis. It is exceedingly mobile, due apparently to an atrophy of the epiphyses of the bones. Thus, the joint can be bent backward at a marked angle, quite impossible when the olecranon and its opposing surface are intact. The attachments of the head of the radius and upper end of ulna are loosened, allowing a sort of wabbling and limberness in making pronation and supination. This preternatural mobility is increased by a somewhat similar condition of the head of the humerus in the glenoid cavity.

The wrist-joint, also, is not firm and staunch (depicted by Dr. Taylor). The chief defect of the knee-joints is an atrophy of the patellæ, which are not more than one half their normal diameters.

In bringing this case to your notice, I desire especially to call your attention to the fatty phenomena and to the bone lesions. The literature of the subject presents nothing

which has added much to the original description of Duchenne, supplemented by a few very thorough post-mortems—especially of Eulenberg and Cohnheim. Duchenne said that the interstitial connective tissue proliferated with the production of fibrous tissue, and that this increase was associated with fat-vesicles; also that the striation was preserved, but was very faint. He does not bring into prominence the fatty changes, which seem to be secondary to the hypertrophy of the connective tissue. Other writers, apparently following Duchenne, or, perhaps, not seeing cases in which fatty changes are prominent (for they are rarely as marked as in our case), have not discoursed much upon the phenomena of lipomatosis. Duchenne says “the subcutaneous tissue contains very little fat.” Eulenberg, however, has brought these changes prominently forward, for in his monograph—founded upon his post-mortem researches—he says there is a great increase of subcutaneous fatty tissue, “most noticeable in places where nature has provided an abundant panniculus”; and, moreover, says of the intermuscular changes, that there is first a proliferation of connective tissue which is transformed into fatty tissue. I think that our case is a striking example of this pathology.

The bone lesions in this case are interesting in view of the tendency at present to connect bone and joint changes with diseases of the central nervous system. This speculation is not a new one, for it was a suggestion of Prof. J. K. Mitchell, years ago—so he is quoted,—that rheumatism may be of neurotic origin. Arthritis deformans has been recently attributed by Weber to a neurotic source, but the argument is largely from a therapeutic standpoint, viz.: as the disease does not improve on anti-rheumatic treatment, and does improve on general tonic and galvanic treatment, ergo—a neurotic origin. There are undoubted bone lesions, caused by disorders of the cerebro-spinal axis, as has been shown by Prof. H. C. Wood in a recent clinical lecture. He refers to bone changes in insanity, especially dementia paralytica, in hemiplegia, and locomotor ataxia. These changes are described as atrophy, hypertrophy, and inflammation. A true causative relation is shown, but we are wanting in an exact pathology as to what trophic centres, if any, are

affected, and in what manner. Bone lesions in pseudo-hypertrophic muscular paralysis have not been brought into any prominence in the investigations which I have consulted, and in many cases not even referred to. Scoliosis, which exists in one case, is mentioned by some and ascribed to the weakened state of the muscles—no doubt a true explanation, but such changes as I have described in the elbow and knee appear to be unique.

As a possible explanation of these impaired bones, I am reminded of the dictum of Duchenne. It was not the belief of this great clinician that pseudo-hypertrophic muscular paralysis was at all identical with progressive muscular atrophy, or that it was of central origin. It seems probable that the case before us may be an expression of that faulty development which overtakes, in some defective births, all tissues, and that pseudo-hypertrophic muscular paralysis, associated as it often is with impaired brain and nerve function, may be but a form, in some cases at least, of congenital deficiency of developmental power.

Dr. CHARLES K. MILLS said he had that day seen a case at the Philadelphia Polyclinic, interesting in connection with Dr. Lloyd's remarks on bone and joint lesion originating from the nervous system. The case was that of a mulatto woman who is changing to a bronze color, and in addition, the upper half of the body is affected with muscular atrophy. The joints, more particularly the smaller ones of the right hand, are swollen, rigid, and painful; the hands were in a half-closed position. She had perverted sensation in her face, loss of the sense of taste, difficulty of swallowing, and could only open her mouth half way on account of the muscles of deglutition and mastication being affected. The case illustrated the connection between muscular degeneration and joint and other trophic affections.

Dr. N. A. RANDOLPH read "A Note on the Behavior of Hydrobromic Acid and of Potassium Iodide in the Digestive Tract."

I venture to present before the Society a brief note upon a subject not strictly neurological, but having direct bearing upon the relations entertained to the processes of digestion by two drugs which are of interest to the neurologist.

In a series of artificial digestions, in which hydrobromic acid was present in the digestive mixture in amount corresponding to the therapeutic dose, I have noted:

(a) That salivary digestion was completely suspended, whereas

(b) The peptonization of proteid food-stuffs was in no wise retarded, the variation from the normal, if any, being toward an acceleration of this process.

It is evident, therefore, that, other things being equal, the appropriate time for the exhibition of this drug is immediately upon the cessation of salivary digestion within the stomach, or, in other words, upon the first formation of free acid within that viscus.

Recent studies¹ have shown that the acidity of the gastric contents, found even in quite early stages of digestion, is not due to the presence of *free* acid; and the ingenious observations of von den Velden² go far toward proving that the development of free acid within the stomach does not occur until from forty-five minutes to an hour after breakfast, and from one to two hours after dinner. These results were obtained chiefly by the use of methyanilin, violet and tropæolin bodies, delicately responsive, by color-change, to the presence of free acid. There is little doubt in my mind that hydrochloric acid is developed in the stomach at an earlier period than that above indicated, but it seems very probable that by immediate combination with albuminoid it loses somewhat its characteristic activity. This is illustrated by an observation made in the course of this study, namely, that the addition of small amounts of potassium iodide to dilute solutions of acid albumen containing two tenths of one per cent. of hydrochloric acid does not result in the liberation of iodine. The addition of the same amount of the iodide to the same quantity of an aqueous solution of hydrochloric acid of the same degree of activity results in an immediate liberation of iodine.

This interesting discovery of two stages of acidity in the gastric juice has, I believe, not yet been incorporated in the

¹ *Deutsch Archiv klin. Med.*, xxiii., 369. See also *Jahresb. ü. d. Fortsch. d. Thier-Chemie*, 1880, p. 302, and Danilewsky, *Centralb. f. d. med. Wiss.*, 1880.

² *Zeitsch. f. physiol. Chemie*, iii., 205.

text-books. It serves to reconcile the contradictory opinions so frequently found as to the value to the economy of saliva as a digestive fluid, and explains the completely diverse results obtained by such careful workers as Frerichs¹ and Bidder and Schmidt.²

Besides an observance of the time-limitations just indicated, I would suggest the advisability of milk as a vehicle for the administration of hydrobromic acid. The curd thus formed is fine and flocculent, the mixture closely resembling buttermilk in taste and appearance, and in no wise suggesting medicine. I have taken as much as a tablespoonful of the dilute acid in a tumbler of milk without any repugnance. The milk used must be raw. With this, as with most other acids, boiled milk gives tough and bulky coagula.³

As regards the exhibition of the iodide of potassium, the rationale of its time-relations is altogether different. Although this drug is distinctly alkaline, its presence in a mixture of hydrated starch and saliva certainly does not suspend the action of the amylolytic ferment, nor, so far as I can determine, materially retard it.⁴ When, however, the iodide is added, even in very small amount, to a mixture of artificial gastric juice and egg albumen or fibrin, the rapidity of peptone formation, as determined by the nascent mercuric iodide reaction⁵ or by the biuret reaction and control test, is greatly diminished. This result is not due to a slight diminution in the acidity of the solution, caused by the addition of an alkaline body; for the same effect is noted when the acidity of the solution is at once again brought up to the normal degree. The pepsin is apparently but little, if at all, affected by the presence of the iodide, if we may judge by the indifference of ptyalin to the drug, and by the fact that quantities of the iodide corresponding to the maximal therapeutic dose neither entirely suspend

¹ Wagner, "Handwoerterbuch d. Physiologie," iii., a, 772.

² Bidder und Schmidt, "Verdauung u. Stoffwechsel," p. 27.

³ Randolph, "Verbal communication on differences between raw and boiled milk."—*Proc. Acad. Nat. Sci. of Phila.*, 1884.

⁴ Langley and Eves, *Jour. of Physiologie*, iv., p. 19, have shown that although a distinctly alkaline medium retards salivary action, the presence of a proteid body in the digestive mixture will prevent this retardation.

⁵ Randolph, "A reaction common to peptone and bile salts."—*Proc. Acad. Nat. Sci. of Phila.*, 1884.

the peptic activity nor induce greater retardation of the digestion than do much smaller quantities. A slight effect is exerted by the iodide upon the proteid food-stuffs, evidenced in an increased toughness produced in, *e. g.*, fibrin, and, when the drug is abundantly present, in the acquisition by the albuminoid of a slight yellow tinge, due to staining by iodine, which is liberated by the free acid of the artificial gastric juice.

The most important factor in the delay of peptonization lies in the power possessed by potassium iodide, even in relatively minute quantity, of precipitating acid albumen in solutions which shall, after its addition, possess the normal degree of acidity of human or even canine gastric juice. The same may be said of potassium bromide and of several other analogous compounds. The precipitation effected by the iodide is so complete that, when solutions of acid albumen are thus treated and filtrated, the still acid filtrate yields no trace of proteid matter. This observation, which is doubtless old, though I have as yet been unable to find it recorded, tends to show that the time at which the administration of this drug is least liable to disturb digestion is either during or immediately after the ingestion of food.

There are several sources of error in attempts at deduction from the results of artificial digestion, as ordinarily performed. Thus the continued activity of a digestive fluid is largely conditioned by the removal of the products of its action soon after their formation. This occurs in the living viscus, but not in the test-tube of the experimenter. The maintenance of the normal temperature of the active stomach is, of course, readily accomplished, but the conscientious imitation of other factors in the normal digestive process implies not only a constant mechanical intermingling of food-stuff and digestive fluid, but the continued addition of small amounts of the digestive fluid itself. I have nearly perfected an apparatus which in a large degree obviates the difficulties just cited.

In its artificial salivary digestions are conducted in a thin tube of fish-bladder, closed at one end, which is, by mechanical means, kept in gentle agitation. The contents of this tube are maintained at the proper temperature by a sur-

rounding body of warm water which is slowly but constantly changed. For gastric digestions the animal membrane is substituted by one offering 'equally great surface for dialysis, but resistant to peptic action. Despite, however, the inaccuracies attending existing methods of study, the following deductions from the facts, old and new, which are here presented, appear justifiable :

I. That the earliest production of free acid within the stomach is approximately three fourths of an hour after a meal; its appearance being still further delayed by the ingestion of food in large quantity ;

II. That hydrobromic acid is liable to impede the digestion of starchy foods when administered within the interval just named ; and

III. That iodide of potassium should be given at such time and in such dilution that its absorption shall be complete before the appearance of free acid within the gastric contents.

Dr. FRANCIS DERCUM said he thought the suggestion of using milk as a vehicle for hydrobromic acid a very good one.

Dr. S. WEIR MITCHELL spoke of the utility of hydrobromic acid given with bromide of potassium.

Dr. E. T. REICHERT referred to the paper recently written by Dr. H. C. Wood, on the " Use of Hydrobromic Acid in Epilepsy." He said it confirmed the conclusions which he had come to in a paper on the physiological action of hydrobromic acid, published some years ago. He believed that hydrobromic acid could be substituted for bromide of potassium, as it had the same physiological qualities as the bromide.

Dr. S. WEIR MITCHELL read a paper on "Œdema of Hysterical Hemiplegia and Unilateral Swelling in Hysteria Generally."

Dr. CHARLES K. MILLS said he had seen similar cases to those reported by Dr. Mitchell, but had not studied them closely. In a case of hysterio-epilepsy, with hemi-anæsthesia, etc., there was œdema of both limbs, but the swelling was most marked on the affected side, and was chiefly below the knee. In another case recently seen at the Philadelphia Hospital, the swelling of the limb was very decided.

In some cases of hysterical paraplegia he had noticed these swellings, but had not made them a special study. He also referred to a case of hysterical contracture of the wrist with marked œdema.

Dr. SINKLER spoke of having seen a number of cases of slight temporary swellings of the limbs in hysterical women. He mentioned a case of this kind which he had seen at the Orthopædic Hospital. It was that of a woman whose hands, feet, and legs would become, at times, slightly swollen, but it was temporary, as it would entirely disappear.

A stated meeting of the Society was held Monday evening, October 27, 1884, the Vice-President, Dr. CHARLES K. MILLS, in the chair.

The first paper was "On the Artificial Induction of Convulsive Seizures," by FRANCIS X. DERCUM, M.D., Ph.D., and ANDREW J. PARKER, M.D., Ph.D. (see page 579.) This paper was discussed by Drs. RANDOLPH, MASSEY, LLOYD, and MILLS.

The next paper was "On the Dietetic Factor in the Treatment of Angina Pectoris," by N. A. RANDOLPH, M.D.

There has recently been under my care a patient suffering from true angina, in whom, as is not seldom the case, any slight gastric irritation constituted the immediate exciting cause of the frequently recurrent paroxysms.

After the last attack there existed an inability to retain the lightest and simplest foods, their ingestion inducing not only nausea but much cardiac distress. Recourse was had, with advantage, to milk, partially digested by the commercial Extractum Pancreatis; but the flavor of the resultant preparation was unappetizing, and finally became repulsive to the patient, who whimsically described its taste as that of "stewed corpse."

To meet this emergency, there were devised two food products, which I have not seen described, and which, in practice, proved eminently satisfactory.

I. *Pancreatized Oysters*.—The oysters of an ordinary stew (containing milk) are removed and finely minced, then returned to the liquid portion of the stew. The whole is brought to a temperature of 100° F., the appropriate proportions of pancreatic extract and sodium bicarbonate are

added, and the mixture maintained at the temperature mentioned for thirty minutes, with occasional stirring. It is then strained and served, and forms not only a highly nutritious and palatable soup, but one which is retained by very irritable stomachs, and utilized with a minimum of digestive power. After boiling, to prevent the further action of the digestive ferment, gelatine may be added, and the mixture served cold, as a jelly. Cooked tomato, onion, celery, or other flavoring suited to the individual taste of the patient, may be added at the beginning of the artificial digestion, and the solid residue removed in the final process of straining, at which time it will be noticed that the mixed oysters originally added have been in great part dissolved.

II. *Pancreatized Milk-Toast*.—Ordinary milk-toast, in which there is an abundance of milk, when digested in the manner just described, becomes an almost homogeneous pulpy mass, which, when the crusts have been removed, is usually acceptably retained by the irritable stomach. In extreme cases, however, it may advantageously be strained and the fluid portion alone used, in which the partially peptonized solution of casein of the milk is reinforced by actually digested gluten and starch of the bread, together with a very little dextrin. Light plain sponge cake may be similarly digested, and occasionally forms a desirable change.

In conclusion I would express the hope that these rather homely suggestions may prove of value in other hands in extending the somewhat scanty bill of fare suited to patients suffering from gastric hyperæsthesia, and the various neurotic troubles of which such a condition may be the exciting cause.

Dr. DERCUM said he made an artificial preparation of beef, by using the pure gland of pepsin and beef, which was palatable, and answered the purpose admirably. He also used it by enemata.

Dr. G. BETTON MASSEY made a few remarks on "The Polarity of Currents of Medical Coils."

He called the attention of the Society to a singular omission made by the authors of most books on electro-therapeu-

tics. After stating in the introductions that induced currents were to-and-fro, with constantly changing polarity, they subsequently refer to these as having a fixed polarity, and make no explanation of this seeming impossibility. It is a fact readily tested by any one, that these coils furnish a current of one direction (the direct induced), at the opening of the battery circuit, and none at the closure. As it is difficult to close the battery circuit by hand in these batteries, without an irregular opening occurring at the same time, the currents due to this "raggedness" of the contact have been mistaken by some for inverse currents induced by the closure. Care, however, will eliminate this source of error, and prove that only currents produced in both primary and secondary coils at *opening* of the battery current are strong enough to be perceived by the senses. In the primary coil, whatever induction occurs at the closure, of course, goes through the cell as the short route. In the secondary coil this closure current is supposed to be inhibited by the simultaneously formed extra current of the primary coil. At any rate, it is not strong enough to be perceptible, and all, therefore, have genuine polarity, in our Faradic batteries.

Dr. LLOYD said that he did not think that Dr. Massey was quite just in his criticism on modern writers, as Erb and one or two others mentioned the facts in their works.

Dr. MASSEY said he was misunderstood, as he had said that *most* writers did not allude to it.

Dr. W. SINKLER said he wished to call the attention of the Society to a "Temperature Record of Each Side of the Body in a Case of Hemiplegia." He said, from the beginning to the end of the seizure the temperature on the affected side was from one fifth to one degree higher than on the other side.

The regular stated meeting was held November 24, 1884, the President, Dr. S. WEIR MITCHELL, in the chair.

Dr. Mitchell asked Dr. C. WOODNUT, resident physician in the Philadelphia Orthopædic Hospital and Infirmary for Nervous Diseases, to read the notes of a "Case of Erythremelalgia," which had been under Dr. Mitchell's care in the hospital.

J. C. R., æt. fifty-three married, blacksmith, family history good. Mother died at 72. Father still living. Six sisters still living and healthy; two died young. He has three children, all healthy. Has had scarlet-fever, and at twenty, variola, which left him slightly hard of hearing. Otherwise always perfectly well until September, 1881, when he first noticed pain on inner side of second toe of the left foot. One year after, the third toe was affected; later, the little, then the fourth, and about four months ago the great toe—all on the same side. They were all affected in the same manner—first a burning, then an aching pain, and some weeks after there would be discoloration of more or less of the toe. Great toe has been least affected of left foot, only feeling sore at tarso-metatarsal joint.

One year ago the pain began in the right foot, first appearing, as in the left foot, in the second toe. Now it affects second, third, and fourth toes, but not so badly as in the other foot.

Pain is not noticeably worse in wet or cold weather. It is worse at night when the feet get warm. The last seven months, however, this was not so marked. Has occasionally had twitchings, chiefly at night, in calf of left leg and bottom of left foot. About six years ago the arms began to ache at night, and do occasionally yet. Pain is confined, to muscles apparently, just above the elbows. Arms are not quite so strong as formerly, but attributes it to want of use. Nine years ago ran a harrow-tooth in outer side of bottom of left foot. It healed without difficulty, and left no apparent after-symptoms.

In January, 1883, had second toe of left foot amputated at proximal joint. It healed slowly, but relieved the pain not only in that toe, but also in the others.

The surgeon who removed the toe said that the amputated portion was "turned to gristle and had no circulation."

Has no history of syphilis nor alcoholism.

At present all the toes affected are discolored. The left foot, up to the ankle, is covered irregularly with reddish patches, sometimes dark and sometimes brighter, disappearing on pressure, and more or less sensitive. Little discoloration on right foot except at corners of nails, and the disease has not developed so rapidly in the right as in the left foot.

Foot more or less swollen to the ankle. "Tendons seem sore." Occasionally pain in outer left ankle. Occasionally whole leg aches, but greater pain is on the spots of redness.

Pain on walking in the ankle and in the bottom of foot, so can

only walk two or three blocks. Within the past few weeks a number of patches have appeared on the left leg, and one on the spine about the middle of dorsal region. For six or seven years has had occasional pains down the spine. It probably comes from a former sprain.

Also occasional sharp shooting pains at back of neck, on each side of spine, and down toward the shoulders, in the direction of brachial plexus. Not tender on pressure.

Sensation slightly diminished in the whole left limb, except on the patches of redness, where it is increased.

Elec. condition: no de. r.; response equal in both legs to galv. c.; Far. c., slightly diminished action in left leg below knee; sensation to both currents lessened in left limb. Measurements—r. calf, $13\frac{1}{8}$; l., $12\frac{1}{2}$; r. thigh, $20\frac{3}{4}$; l., $20\frac{1}{2}$.

Temp. r. $92\frac{2}{5}$, l. $93\frac{1}{5}$.

Dyn. r. 71, l. 70.

Appetite good, and, excepting pain, feels as well as ever. Urine, sp. g. 1.027; no albumen nor sugar.

His treatment has been absolute rest, massage, descending galvanic current, and hot and cold applications to the spine once daily. Chloride of gold and sodium, Fowler's solution, and ergot have also been used.

Nov. 21, 1884.—An irregular-shaped patch appeared on dorsum of each wrist, preceded for forty-eight hours by pain and soreness; disappeared after being out thirty-six hours.

Nov. 23d.—Redness appeared on each arm above elbow. Not preceded by pain, and appearing just after massage. Massage also brings it to view more plainly in the leg.

After the reading of the notes, Dr. MITCHELL brought the case before the Society.

Dr. CHARLES K. MILLS said he had seen quite a number of similar cases. His belief was that some at least of these cases were spinal in origin. The fact that some get well is not against this theory. A few years ago he had attended a lady who had all the symptoms of diffused myelitis, from unknown cause. He had also studied several cases of arsenical paralysis due to diffused myelitis. When the feet were pendent, in these cases, they would become hot, red in color, etc., like some of the cases of erythemelalgia. Dr. McBride of New York has described another type of cases, in which the limb is diminished in size, is cold, blue, etc.

Dr. MITCHELL said that he had no doubt but that some of the cases of erythemelalgia were spinal in origin. He was not so certain, though, as to the spinal condition. In some of the cases an hysterical condition is present.

Dr. GUY HINSDALE exhibited, with some remarks, a "Model of a Phantom Brain."

The model is of large proportions, and is intended to show the course of the fibres in the human brain and their relation to the cortex, to the ganglia, and to the spinal cord. The preparation has been recently purchased by Dr. S. Weir Mitchell, for the Mütter Museum of the College of Physicians of Philadelphia, and was constructed by Buechi, of Berne, Switzerland, under the supervision of Prof. Acby.

Its height is one hundred and twenty five centimetres ; its width, seventy centimetres. The cortex is dotted over with numerous corks, two centimetres long, which are distributed in systematic order. The basal ganglia are seen in their appropriate places. The spinal cord, made up of ganglia and columns of nerves of different colors, is represented throughout a portion of the cervical region.

Dr. GUY HINSDALE read notes on "Potassium Bromate and its Action in Nine Cases of Epilepsy."

Bromate of potash, KBrO_3 , resembles in some respects chlorate of potash, while retaining the characteristics of bromides. It was used in the spring of 1881, by Dr. Weir Mitchell and Dr. Hinsdale. The latter made a personal test of the substance, and found that doses of ten, twenty, and thirty grains, three times a day, slowed the pulse decidedly, and depressed the heart, the larger doses causing purging and drowsiness. A single dose of forty grains caused watery discharges from the bowels and drowsiness.

In the nine cases of epilepsy its use was satisfactory in only one ; doubtful in two ; unsatisfactory in six. The drug is such an irritant poison, and depresses the heart to such a degree, that the substance had to be discontinued in most cases, although it evidently controlled the seizures.

THE MEDICAL JURISPRUDENCE SOCIETY OF PHILADELPHIA.

Regular stated meeting, November 11, 1884, the Vice-President, GEORGE W. BIDDLE, Esq. in the chair.

Dr. CHARLES K. MILLS read a paper on "The Case of Joseph Taylor, an Insane Prisoner Convicted of Murder in the First Degree" (see page 589).

Dr. H. C. WOOD also read a paper on "The Absurdities of the Law as Illustrated in the Taylor Case" (see page 603).

DISCUSSION.

District-Attorney GEORGE S. GRAHAM said that one cause of the difference between the legal and the medical professions was that one looked at insanity from a legal and the other from a medical, point of view. He trusted that the time would come when commissions would be authorized to deal with the question of mental disease and responsibility. It was not the absurdities of the law that called for comment, but the positions taken by medical experts when they come into court. Even experts might differ. The difference between insane delusions and delusions in a sane person was too fine a metaphysical distinction. The view taken by the jury in the Taylor case was that his delusions were satisfactorily accounted for. There was medicine given him and it had certain effects. So long as the effects were present, the prisoner continued to believe that the medicine was given him. The District-Attorney promised that at some time he would present a paper "upon the absurdities of the insane expert—or at least of the expert upon insanity." When a man had imbued

his hands in blood he would endeavor to convict that man if there were any doubts as to his mental condition. The doctors might analyze him afterward, chemically and anatomically. In the Taylor case there was sufficient doubt to warrant pressing for a conviction.

Dr. ROBINSON, the Penitentiary physician, said that he had had experience with at least fifty cases of insanity, and that he felt perfectly competent to testify. The class of criminals was a peculiar one, and required special study. "Only to-day," he said, "Taylor acknowledged to me that he was mistaken about the medicine in his food and drink. No one who held the conversation he had had with him to-day would call him insane. Since the trial he has made no complaint. He had constantly had experience with simulated delusions. Since the trial Taylor had said he had made a — fool of himself, and that his counsel would have been wiser to try to save his neck by a plea of self-defence, as no one had seen him kill Doran. "But, I believe I ought to hang," said he. "Let them hang me."

E. COOPER SHAPLEY, one of Taylor's counsel, remarked that he thought it not wise to discuss a question yet to be argued. He asked Dr. Robinson whether he thought Taylor sane at the time the experts examined him, and Dr. Robinson replied: "I was not satisfied that he was sane at that time."

HAMPTON L. CARSON, Dr. S. SOLIS-COHEN, and Dr. JOHN H. PACKARD made brief remarks, and GEORGE W. BIDDLE, the President of the Society, expressed his belief that the Taylor case had been dealt with correctly. Not every delusion that a man might possess made him unfit to be treated as a criminal. Some of the brightest minds had been subject to delusions or illusions. The great Paschal, at one time, believed that his body was made of glass. Where there was simply a delusion, which did not lead irresistibly to the commission of a crime, then a man was criminally responsible. Was the man so unsound that he was unable to distinguish the moral bearings of the question? Was he so irresistibly impelled to the deed that he could not control himself, even from an act against his will and his

perception? Such a case never would be pressed to conviction before a court of justice. Probably this was going further than the English law. There was not an irreconcilable difference between law and medical science.

At the close of the discussion Drs. MILLS and WOOD briefly reviewed and replied to the remarks made, and reasserted their belief in Taylor's insanity.

THE MEDICO-LEGAL SOCIETY OF NEW YORK.

Meeting of Sept. 24, 1884.

CLARK BELL, Esq., President, in the chair.

A paper was read by the President, entitled "Madness and Crime," of which the following is an abstract.

The legal tests of responsibility of the insane, as applied under the English law, and in the American States, have given rise to grave discussion, which must interest and arouse every thoughtful legislator, in the inquiry now forced upon the public mind, which is intensified by the cases of Gouldstone and Cole in Great Britain, and of Guiteau and similar cases here.

The medical profession may be said to substantially agree as a body, that in homicides by the insane a knowledge of the character of the act committed, and of its being in violation of law, is not a safe and reliable test of the responsibility of the perpetrator. Indeed, medical men substantially concur that the insane, who are confessedly irresponsible for their acts, are, as a rule, able not only to discriminate between right and wrong, but to comprehend and know that their act is in violation of law, and frequently understand its full nature and character and the legal consequences.

The most careful, conscientious, humane, and discreet alienists now tell us that the insane do know that the act is wrong, often fully understand its nature and consequences, and, as a rule, can discriminate between right and wrong in acts which they commit under the force of insane delusions, which they are not able to resist, and which affect and oftentimes control their action, and they insist that these truths

must be considered in determining criminal responsibility in all these cases.

The thoughtful men of the bar must acknowledge this to be a fact. They must concede that the rule of law, as interpreted by the English and American courts in many cases, is misleading and faulty, and that the whole subject demands the careful revision of the law-makers, and that at an early day.

The case of Gouldstone illustrates fully the state of the present law in Great Britain, and the need of a speedy change in legal procedure in such cases there.

That Gouldstone was insane cannot be doubted, and that fact has been found since the conviction, upon a formal inquiry directed to be made by Sir William Harcourt, the English Home Secretary, by Dr. Orange and Dr. Clarke, eminent alienists, who reported him to be insane, upon which report he was reprieved by the government.

James Cole was indicted for the murder of his own child, aged three years and eight months, in August, 1883. The trial was held in the Central Criminal Court of London, October 18, 1883, before Mr. Justice Denman. He was convicted.

The Home Secretary, Sir William Harcourt, ordered a medical examination also in the case of Cole, and Dr. Orange and Dr. Glover, who conducted it, pronounced him unquestionably insane, and he was reprieved.

Dr. H. Hack Tuke made a forcible criticism of both these cases of Gouldstone and Cole, in the January number of 1884 of the *Journal of Mental Science*.

The charge of the judge in the case of Guiteau fairly stated the law, not quite as strong and broad as the English judges in the cases of Gouldstone and Cole, but substantially within the recognized rule, as it is now laid down in most of the American States.

No one can pretend for one moment to deny that Guiteau fully understood the nature and quality of his act; nor that he was able to discriminate between right and wrong in regard thereto, and that he fully understood that it was a crime at law, and well knew the penalty which the law imposed.

If the legal test established by the English judges in 1843, or as laid down by Judges Day and Denman in the cases of Gouldstone and Cole, were to apply, the jury in Guiteau's case must, of course, convict.

In no case of insanity of the character of melancholia or with suicidal tendencies, where the disease is not readily detected, nor in any case of obscure character, is it possible ever to claim that the insane prisoner does not both know and fully understand that the act is wrong as human standards are measured, and it must generally be conceded that he also well understands the nature and quality of the act and its penalty under the law.

How far is this a reliable test of responsibility? Have we not come now to the point where the legal gentlemen can unite with medical men, and call a halt upon the justice or propriety of this remaining longer the law of such cases?

Mr. Bell quotes Sir James Fitz-James Stephens from his recent work on criminal law as follows :

Sir James comments upon the answers of the judges in the McNaughton case, and holds that their authority is questionable, though he has followed them as a judge, and concedes "*that when they are carefully considered they leave untouched the most difficult questions connected with the subject, and lay down propositions liable to be misunderstood*"; but he claims that they should be construed "*in a way that would satisfactorily dispose of all cases whatever.*"

He reduces the doubtful points to the single question : "*Is madness to be regarded solely as a case of innocent ignorance or mistake, or is it also to be regarded as a disease, which may affect the emotions and the will in such a wanner that the sufferer ought not to be punished for the acts which it causes him to do ?*"

Again, Sir James claims that, yielding the point that the answers of the judges must be accepted, though of doubtful authority, "*the law allows that a man who by reason of mental disease is prevented from controlling his own conduct, is not responsible for what he does.*"

In commenting on the answers of the judges in the McNaughton case, Sir James says :

I am of the opinion that even if the answers given by the

judges in McNaughton's case are regarded as a binding declaration of the law of England, that law as it stands is that a man who, by reason of mental disease, is prevented from controlling his own conduct is not responsible for what he does.

I also think that the existence of any insane delusion, impulse, or other state which is commonly produced by madness, is a fact relevant to the question whether or not he can control his conduct, and as such may be proved, and ought to be left to the jury (p. 169).

He continues :

The proposition, then, which I have to maintain and explain is that, if it is not, it ought to be the law of England that no act is a crime if the person who does it is, at the time when it is done, prevented, either by defective mental power or by any disease affecting his mind, from controlling his own conduct, unless the absence of the power to control has been produced by his own default. * * *

No doubt there are cases in which madness interferes with the power of self-control, and so leaves the sufferer at the mercy of any temptation to which he may be exposed ; and if this can be shown to be the case, I think the sufferer ought to be excused (pp. 168-170).

He also quotes Dr. John C. Bucknill, who, in his admirable review of Sir James' book, criticizes Sir James' definition of insanity (*Medico-Legal Journal*, vol. 2, p. 190), and says: And I am also inclined to agree with Dr. Bucknill that, notwithstanding the written views of both Sir James and Chief-Justice Cockburn, the law of England to-day as administered is as laid down by the judges in the McNaughton case, although quite agreeing with Sir James that its strict enforcement would lead to monstrous consequences in many instances.

He then quotes the provisions of the New York Penal Code.

Mr. Bell concluded as follows :

The time has come when legislators must face this question upon its merits. The able and masterly manner in which Sir James discusses the question, the decisions in many of the American States recognizing a different test for responsibility, call for a settled law both in England and

America, which would be in accord with the principles of justice and commensurate with the civilization of our age.

I think legislators, as well as judges who administer the law in both countries, must feel that the time has come to carefully consider this question, and to state the law of responsibility in this class of cases so clearly, as to remove the very just criticisms everywhere made upon the dicta of some of the judges.

There is no doubt whatever that the uncertainty of verdicts is largely due to the popular conviction of the injustice of the law as it now exists, and as it is frequently construed by the courts.

I am not unconscious of the fact that some judges have decided against what may be called the views of the English judges in the *McNaughton* case, as notably Judge Ladd, of New Hampshire, in the case of *Jones* (*State vs. Jones*, N. H., 388); Beardsly in *People vs. Freeman* (H. Denio, 27); and Judge Brewster of the Phila. Common Pleas in 1868, who held that the true test lies in the word "power."

"Has the defendant in a criminal case the power to distinguish right from wrong, and the power to adhere to the right and avoid the wrong?" (Wharton and Stille, § 159.)

Shaw, J. C., in *Commonwealth vs. Rogers* (Bennett and Heard, leading criminal cases, 2d ed., pp. 96, 97).

Robertson, J., in the Kentucky Court of Appeals (Wharton and Stille, § 175). There is a judicial tendency in many of our States to hold an accused irresponsible who acts under an uncontrollable impulse based upon an insane delusion, even though he fully understands the nature and consequences of his act, and can discriminate between right and wrong, but the rule in this country, and surely in England, is greatly affected and controlled by the action of the English judges in 1843.

It is a legislative and not a judicial question, and must receive public attention commensurate with its great importance in the administration of criminal jurisprudence.

DISCUSSION.

Dr. CARNOCHAN: from the part of the paper I have heard read, a great deal will depend upon the definition of

the word "insanity." That seems to be the trouble with all the decisions. There is scarcely a decision given, where a man is tried and the plea of insanity is interposed, but there is a difference of opinion in regard to the meaning of "insanity." The question is not answered, because of the misunderstanding; the meaning of the word is loosely understood, and the authorities that Mr. Bell has quoted, all of them seem to be running away from the judges and medical definition and referring it to the lawyers.

Hon. GEO. H. YEAMAN: I thoroughly agree with Dr. Carnochan that the great stumbling-block has been in fixing any clear definition as to what insanity is. The difference between harmonious action and abnormal action is such that it is impossible to say, on the one hand, when you have reached legal darkness, and, on the other, when you have reached legal light.

I confess that I stand here to-night astonished to hear the exposition of the law of England, as set forth by Mr. Bell. That part of it relating to the power of knowing the moral quality of the act I am quite familiar with; but that there should now be an actual struggle to introduce the other element, that a man shall not be blamed if, at the time of the act, he was under an uncontrollable impulse, astonishes me beyond measure. I take my seat, recognizing the insurmountable difficulty that occurs all through this discussion. I have also recognized that the stumbling-block is the want of a satisfactory definition of what is insanity, upon which the courts may say, on this side, he is responsible, and on that, he is irresponsible.

Mr. AUSTIN ABBOTT: Concerning the question of uncontrollable impulse—it is not enough to show us that a majority of medical experts recognize its existence in minds capable of knowing the act to be wrong. Before it can safely be adopted as a rule of law, it must be ascertained and recognized with such general concurrence that it can be practically established in a judicial tribunal. An advance in medical knowledge on the subject far beyond what has yet been reached is necessary, in order to enable the courts to try the question whether it existed in a given person at a given time in the past.

The psychologist's analysis of the subject has not yet gone so far as to enable him to describe this condition in terms which are sufficiently exact to be usable in legal discussion, investigation, and adjudication.

There are underlying reasons which, perhaps, may postpone the realization of this proposal beyond the time when the nature of this uncontrollable impulse becomes understood. It is the general impression, now, that a person should not be punished except for that which *he knew* was wrong. But the legal test of liability is not whether he knew, but whether he *had the capacity*; and, if he had the capacity to know, the want of knowledge is not relevant.

But there is probably a deeper reason why the law has so long and so persistently treated men as amenable to punishment if they had the capacity to know the right and the wrong of the thing, irrespective of whether they actually did know it, and irrespective of the excuse of uncontrollable impulse,—a reason to be found in the history of the course of development of the sense of justice among men.

The order of development is punishment first and knowledge and self-restraint afterward. The law, therefore, does not postpone the punishment until after those qualities are possessed, but establishes it as a means of awakening those qualities.

I do not think that medical men appreciate, generally, the power which the existence of the law and its penal sanctions exercises on the lawless in aiding the control of what would otherwise be uncontrollable impulse.

But, it is objected, here are these men, whom it would be wicked to put to death. Does not, however, the present system provide or allow provision for them in a manner which is quite proper, so long as the question remains a medical question, and not one, in its nature, capable of being satisfactorily solved by the usual legal methods? Was not exactly the right course pursued in England in the trial of these men; in their conviction; in the interposition of medical men, who could advise in the particular cases; and in the reprieve and commitment to asylums?

The question is one of great interest and importance, and one which demands the elucidation of medical science, but

from the best reflection that I have been able to give to the theoretic aspect and to the practical workings of the subject I am confirmed in the opinion that there is much more to be done—if it be possible to be done—in the elucidation of the medical aspects of the question, before we shall have the means of the safe and satisfactory investigation of uncontrollable impulse as a provable fact in criminal jurisprudence.

R. H. LYON, Esq. : I am inclined to think that the rule, as laid down in the *McNaughton* case and as incorporated in our Code, is amply sufficient for all practical purposes, and is as well adapted, as any rule of law can well be, to meet the requirements of such legislation, or that protection to society, to secure which such rules are made. The flexibility of the rule lies in the facility of its application to the cases coming up for trial, and why not, as suggested by Sir James Stephens in his learned comments upon this subject, let it always be the question of fact submitted to the jury for their determination, whether the accused, though lost to self-control, knew the nature of the quality of the act he was doing, and whether he knew it was wrong? If the fact be found that he knew the nature and quality of the act committed, and knew it was wrong and still did it, why should the plea be allowed as a sufficient defence that he did it because he could not help it? With the knowledge in question, is he not bound to help it—if in no other way than—by placing himself, conscious as he must be, under the conditions assumed of this lack of self-control against criminal conduct, under such outward restraints that it will be impossible for him to give way to his impulses or commit the crime? Evil acts under sudden uncontrollable impulses are conceded to be the result of passion, and hence criminal; but where not so sudden, should this not be held by law to be the duty of such a person possessing the knowledge in question? He is not so insane but that he is at large in society and enjoying all the freedom of the ordinary citizen and the protection that society gives to such. What hardship or real injustice, then, can it be to him, under such circumstances, that he should be required as a reciprocal duty he owes to society for what he is thus

permitted to enjoy, to protect himself against himself, for the better security of those about him, as he would be enabled to do generally, if not, indeed, always, possessing the knowledge he is assumed to possess? Is it practicable, in view of the danger that threatens by opening wide the door to such a defence as this lack of power, simply to adopt any other rule that will better serve as a proper safeguard to society against crime? It seems to me not. How easy it is to interpose such a defence as this want of power to desist from doing an act, the nature of which is fully understood, and known at the time to be wrong, by the perpetrator. Who shall draw the line between an insane and a criminal impulse? How shall it be determined, as a matter of legal evidence, that an emotion is an insane one or a sane one? Are the emotions and the forces of the will of one knowing the moral quality of his actions to be thus handled and shown up to a jury? By attempting this, and that too in view of the present uncertainties, latent difficulties, and lack of precise knowledge concerning these relations, we are entering upon that which is too refined for the purposes of being made a practical and safe legal test of criminal responsibility.

Why may not this morbid or irresistible impulse affecting the will be left, with all the other evidences, for the jury to determine—under the rules already mentioned—whether, as a matter of fact, the accused knew the nature or the quality of the act he was doing, and that he was doing wrong?

How can one be said to know the nature of the act he is doing when he has lost his self-control? Why, is it not enough to say as Sir James Stephens says? "Knowledge and power are the constituent elements of all voluntary action, and if either is seriously impaired, the other is disabled. It is as true that a man who cannot control himself does not know the nature of his acts, as that a man who does not know the nature of his acts is incapable of self-control."

Dr. J. M. CARNOCHAN: It seems to me that Mr. Abbott had stated a great deal that is true and correct; but, in regard to the medical aspect of insanity, which he seems to

think so far at error and in the dark, the mere fact that the difficulties in which the subject is involved should stimulate our action.

We should go further and admit the facts of the record. What the medical profession is trying to do is to correct the vagaries of the judiciary, and the men who have been reasoning on the question of insanity since the days of Confucius. We all know very well that healthy philosophy or mental philosophy is just as far in the dark as it was fifty years ago, in regard to the tangible authorities upon which it shall rest. In regard to impulse, in regard to memory, and in regard to all elements of mental action, the medical men are trying to bring about certain principles which will regulate the lawyers as well as the judges, so that when they give a definition, on which the lawyer makes his appeal and the judge bases his charge, we shall get a more rational judicial opinion and a verdict more in accordance with justice and humanity, so that justice, instead of being an intangible quality, will become a quality which the general opinion of humanity will accede to. That's what the medical profession desires. Mr. Abbott will, no doubt, agree that a great many opinions in law and metaphysics are still correct, and founded upon reasoning which physical investigation will prove to be correct. What we want is some authoritative action based upon tangible data, to be subjected to research, criticism, and study, and erected as a foundation of judicial investigation, so that the word "insanity" will mean really something founded upon tangible data, which admits of no dispute by the judges and lawyers—that's what the medical profession desires to accomplish.

Mr. YEAMAN: I would like to ask: Is any thing more inscrutable in its medical aspects, in determining that a man was acting under an insane impulse, knowing the same, than there is in attempting to determine that he acted without capacity?

Dr. CARNOCHAN: As I understand the matter of definition is to be brought up for full discussion at a future meeting; probably the matter will be more fully explained at that time than at the present. We are now debating from a legal rather than from a physical or medical standpoint.

Mr. CHARLES L. DANA: I agree pretty closely with the rule as laid down by Sir James Stephens. It seems to me we cannot take a step in advance more safely than by following the points which he suggests. For a good while the legal and medical professions have been at loggerheads, because the legal gentlemen insist that there are some cases of insanity where responsibility for action still exists, whereas the medical men have said that insanity and irresponsibility go together.

Now, medical science has so enlarged the limits of insanity, that the term includes in strictness a large number of persons heretofore considered, perhaps, only eccentric or vicious. Practically, this carries the doctors back a little toward the legal position. Science and law, however, can never meet upon the old knowledge of right and wrong test. The lawyers, too, must make advances, and this Sir James Stephens has shown they can do.

I believe that the question of a prisoner's sanity or insanity ought always first to be settled by a medical commission. If they judge him sane he goes to trial. But if they judge him insane, that should not settle finally the question of his responsibility or treatment by the law. His insanity might be one of those slight forms of psychical degeneration that but partially destroys responsibility. For society cannot yet afford to let every cranky, border-line criminal be looked upon as an irresponsible. There is a sociological therapeutics which demands imprisonment or hanging more strongly than psychiatric therapeutics demands drugs and the comfortable seclusion of a retreat.

So far as definitions of insanity go, I have read every one of them, and upon analysis they all amount to this, and no more: that insanity is a disease of the brain in which the psychical functions are seriously impaired.

In place of "psychical functions" put some periphrastic metaphysics, and in place of "seriously impaired" put some technical circumlocutions, and you get the conventional definition. I do not deny that these latter may be practically more useful in affecting juries. It is a curious comment upon human vanity, that every alienist writer feels compelled to concoct his own definition, just as every druggist has his

own tooth-powder and every dog-doctor his own mange cure. Immortality awaits the man who first declines to define insanity.

Mr. J. E. MCINTYRE: It seems to me, that there is something in the law which ought to be rectified; and, inasmuch as insanity is a disease of the mind, simply, it is something that should be investigated by men who have studied diseases—men who know what they are investigating. I think if our system of jurisprudence were corrected in this regard we would arrive at much more satisfactory conclusions.

DELANO C. CALVIN: I beg the indulgence of the Society for a moment in saying that Sir James, in his definition of insanity says: "It means a state in which one or more of the above-named mental functions is performed in an abnormal manner, or not performed at all, by reason of some disease of the brain or nervous system." I think that medical minds will agree with me in the suggestion that there may be some functions of the mind performed in an abnormal manner; which, if denominated insanity, persons insane may, with propriety, be regarded as legally responsible for their acts; and for that reason it seems to me that the logic of the learned author is not quite right, especially when he says: "No act is crime if the person who does it is, at the time it is done, prevented, either by defective mental power or any disease affecting his mind, from knowing the nature and quality of his act, or from knowing that the act is wrong, or from controlling his own conduct, unless the absence of power of control has been produced by his own default." I am of the opinion that, in that definition in respect to personal responsibility, the qualification, "produced by his own default," is too broad. If a person becomes intoxicated, and under the influence of that intoxication commits crime, then I think all lawyers and medical men will agree with me in the opinion that he is responsible, and should be so held, for the result of that intoxication; but there are courses of conduct on the part of persons engaged in crime—the result of long-continued abuse of the laws of health and of mental vigor—which may produce a condition of the mind amounting to irresponsible

insanity. I think the medical profession will agree with me upon that subject, and every lawyer will agree with me, in my criticism of Judge Stephens' definition, that the mental functions may be performed in an abnormal manner, so as to relieve a person from knowledge as to his crime, and from any thing like what is denominated an uncontrollable impulse. I desire to call the Society's attention also to this question—whether, in his discussion of the responsibility of a person committing a crime under an uncontrollable impulse, he has not divested the question of the qualification which, I think, every jurist of experience—and certainly every scientific expert—attaches to that uncontrollable impulse, to wit: that that uncontrollable impulse is the result of a diseased mental condition; and for the purpose of making my own views more clearly understood, I will say that in a paper which I had the honor to read before this Society a year and a half ago—in considering the present test of criminal responsibility, "*knowledge of right or wrong*,"—I said: "Permit me to call attention to the obvious absurdity of admitting alienists to instruct the court and jury as to the scientific test of responsibility, and then disregarding the instruction in obedience to a rule of law evolved from a defective philosophy of the mind years ago, and which is now generally discarded by scientists of the highest standing and attainments."

The rule under consideration seems to be based upon the idea that the will is exclusively under the control of the *intellect*; whereas the disturbance of the emotions and feelings are regarded of at least equal consequence to the exercise of the will; and there are criminal cases where the criminal act seems to have sprung entirely from such disturbance. In judging of responsibility, it is necessary to consider the mental condition as a whole. In Germany the criminal code, the result of very careful discussion both by physicians and lawyers, provides: "There is no criminal act when the actor, at the time of the offence, is in a state of unconsciousness or morbid disturbance of the mind, through which the free determination of his will is excluded."

If I were to venture a statement of the test of irresponsibility, I should say that *wherever any function of the mind is*

so diseased as to dominate the will in the commission of the particular act, there is no criminality. In applying the test we must rely upon medical science to determine the extent of the disease and its manifestations, and whether any insane delusion or diseased function of the mind may coexist with a responsible free will.

Dr. MCCLOUD : It seems to me that the definitions given of insanity are very crude in many cases, but we have only to follow up the subject to get it in a much better condition.

CLARK BELL : The American law was correctly laid down in the judge's charge, in the case of Guiteau. That is substantially the law of the land, and a law which, in some cases, may lead, as Sir James Stephens says, to "monstrous consequences." The question now is: Shall the Legislature be asked to consider the matter, and so restate the law, as to bring the judges into a well-recognized idea, of a settled principle of law, more in accordance with the views of the medical profession? As has been said, in Germany it is determined in one way, in France in another way, but in all countries the ability to discriminate between right and wrong, and knowledge of the nature of the act, and of its legal consequences, strongly affect responsibility. I have not, in this paper, attempted to lay down any project, or bring forward any idea or plan of what I would propose to have the Legislature do, or where to place the changes suggested by the situation. I have but quoted what several gentlemen have said upon this subject, to which I am desirous of bringing the attention of this Society. Has not the time come, now, for legislative action, when the medical profession, as a body, is unitedly against what is the recognized law of all English-speaking countries? When minds like Sir James Fitz-James Stephens takes the advanced ground, may I not ask my legal brethren to unite with me in saying that the doctrine of the McNaughton case cannot be sustained on reason or principle? Has not the time come for us to unite in bringing the attention of the State Legislatures in this country to this subject, that they may restate for the courts the doctrine of legal responsibility in this class of cases? My brother Yeaman correctly states what the law of Kentucky was when he commenced practice, as

to responsibility in that State. Mr. Stephens, as a judge, might be compelled to administer the law contrary to the special views which he has advanced in his work. The *law* was substantially stated correctly by Judge Cox in his charge to the jury. I believe that most men who have studied medical jurisprudence in either profession are prepared now to state that the rule in the McNaughton case is not a safe test of legal responsibility. If a man is the victim of an insane delusion, which controls and dominates his action, which he is unable to resist, though he may know the nature and consequences of his act, and be able to discriminate between right and wrong, if his act is the result of or caused by his delusion, he should not be held responsible.

There is tremendous force in the statement and position of Sir James to the legal mind, and his argument is one of the most masterly I have ever read. I have quoted only brief extracts from his able presentation. I have thought it proper to bring up this subject because of its importance. The question is. Shall we address ourselves to the law-making powers of this country and ask for a restatement of the law of responsibility in the American States? In England they have a system which we have not. There the Home Secretary can institute medical inquiry after conviction, and if the medical gentlemen decide that the man is insane, her Majesty's Government can reprieve; but, under that law, the reprieved person is sent for an indefinite period—during her Majesty's pleasure—to an insane asylum for criminals. Here Executive clemency is unconditional pardon, and the man improperly convicted of crime is frequently set free. We have not the safeguards that England has, in some respects; but what I desire is to call your attention to the question of the law of responsibility, and the apparent good reasons for a speedy consideration and restatement of the existing law by the law-making power.

Meeting of October 22, 1884.

The paper of the President, entitled "Madness and Crime," was taken up and its discussion resumed.

The communications of Justice Stanley Matthews, of the Supreme Court of the United States, and of Mr. Justice

Charles P. Daniels, of the Supreme Court of the State of New York, were first read upon that paper.

WASHINGTON, *October 13, 1884.*

MY DEAR SIR :—The subject of your paper—"Madness and Crime"—is a very large and a very deep one. To treat it critically would require much thought and careful discussion, beyond my opportunity or ability ; to treat it otherwise I think will be very unsatisfactory. I shall have to content myself, in responding to your request, with a few suggestions, rather than attempt a systematic statement even of the results of my opinions.

The question does not relate to the actual state of the law, as I would be compelled to decline offering extra-judicial opinions upon judicial questions ; but is rather how far insanity should be permitted to be a defence in prosecutions for crime.

Allow me to say, in the outset, that its importance as a practical question consists not in the fact that many persons have been unjustly punished, who, by reason of insanity, ought to have been excused, but in the other fact that too many persons have been excused from punishment for crimes, under the pretext of having been insane, who ought to have been dealt with as criminals. And the question to be practically considered also embraces the inquiry, in respect to those who, by reason of insanity, cannot justly be tried or punished, what treatment they should receive as insane persons, too dangerous to be at liberty.

In considering the main question, the chief difficulty seems to be, to define with precision the judicial tests of insanity. It is manifest that in one aspect, it is a question of degree, both extensively and intensively. That is to say, a person may be the subject of admitted insane delusions, which affect his conduct only as to particular persons or in particular circumstances ; and, also, one may have sufficient strength of mental power rationally to conduct a particular transaction, or a particular series of transactions, who, in respect to others, of a different and more complicated character, would fail through mental weakness. So that the question of responsibility to law, in reference to alleged crimes, is necessarily a question of degree and of circumstances, and individual in its character. There must, therefore, be a special test and standard in each case, adjusted with reference to its circumstances, including the characteristics and history of the party charged.

It follows from this, that many persons may, in a medical sense,

be afflicted with a disease of insanity, who, nevertheless, in a judicial sense, in reference to the transaction in question, may have acted without being affected by their disease. And hence arise many of the apparent differences of judgment between doctors and lawyers. The former called to testify upon a theoretical case, or upon an abstract one, pronounce the subject insane, who, in the particular matter of the inquiry, may have been influenced only as are all other men in the exercise of sound minds. The man is insane, to be sure, in a medical sense ; but his insanity in the matter of inquiry did not enter as an element in governing his conduct. Judicially, therefore, in that case, he ought to be treated as a sane person.

But whatever judicial tests may be applied to determine in what cases insanity should be allowed as a defence in prosecutions for crime, the point I would most insist on is this : In every case where that defence prevails, the verdict of the jury should declare the accused "not guilty, by reason of insanity." Upon that verdict the judgment of the law should be, that the defendant instead of being set at liberty, be subjected to suitable imprisonment for an indefinite duration, not exceeding in cases of homicide, not punished capitally, the term prescribed for punishment if the verdict had been guilty ; from which he should be discharged only by the act of the Chief Executive, as though in the exercise of the pardoning power, upon satisfactory proof by medical experts and from other sources, of complete and perfect recovery ; and not in such cases until after the lapse of a prescribed period, deemed sufficiently long to furnish satisfactory assurance of permanent restoration.

Great pains, I think, ought to be taken in this or some other equally efficient mode to protect society against the irrational violence of lunatics and madmen, as dangerous to its peace as though they were capable of crime in its technical sense.

Respectfully,

STANLEY MATTHEWS.

CLARK BELL, Esq., New York.

NEW YORK, *October 16, 1884.*

MY DEAR MR. BELL :—I have read with very great interest your address on "Madness and Crime." It is a very complete and very able presentation of the subject, and I am many times obliged for the favor conferred by sending it. But with the constant pressure of other subjects on my time I am unable to add

any thing to the discussion. Every person will agree with you that the conviction of Cole was decidedly wrong. Under any careful application of the legal principles now applied, he would be acquitted of the crime of murder. And there is reason for believing that the same result did not follow his trial, because the evidence that was accessible was not produced. As to Gouldstone, the mental condition permits of more doubt. And the assassin of the President has always appeared to me to have been a person of decided perversion of all moral sentiment, rather than an insane man. I have read the address with great profit as well as interest, and I shall preserve it for consultation on future occasions.

Truly yours,

CHAS. DANIELS.

MR. ROGER FOSTER: Before the close of the discussion I hope to hear from some of the gentlemen present a more comprehensible definition of the term, irresistible impulse, than I am now acquainted with. For I confess—admitting as an extenuation that my study of this question has been very limited—that I have never yet seen one which seemed to me scientific or satisfactory. Many eminent men, theologians and metaphysicians,—amongst whom are two as far apart on other subjects as Jonathan Edwards and Herbert Spencer,—agree in thinking that men are irresistibly impelled to every act which they commit; each act being a single link in one great chain of causation, the origin and end of which human reason has never fathomed. If this be so, how shall we distinguish the irresistible impulse described by writers upon medical jurisprudence from the passions which impel, to the commission of acts injurious to the common weal, men who are not claimed to be insane? The border line between sanity and insanity is confessedly very vague. An abnormal condition of the mind is the best definition of insanity that I know, apart from those which include delusion as an essential element. Yet, is not that condition of mind abnormal which makes a man prone to the commission of crime or vice? And must every man with a violent temper be called a lunatic, and thus become exempt from punishment? Few of us have not known men with an abnormal tendency to drink. Most of these had inherited the appe-

tite; and though they usually kept it under control, at times it would be too strong for them. Shall the law consider them as irresponsible? Many men, again, have an abnormal fondness for women. Such a trait is often hereditary, as might be proved by the example of more than one well-known family.

Are all of these to be considered as legally irresponsible? If so, will you extend the classification so as to include abnormal stinginess, or covetousness producing theft? If lack of motive be the test of irresponsibility, such would be cases where the ordinary mind could easily miss finding one. Where are we to stop?

Such, gentlemen, are the questions which are suggested to me by the interesting essay of our President.

My own views are the results rather of reflection than of study or experience. For that reason I have the less faith in their soundness. It is my hope that some one who succeeds me will make the matter clearer to my mind.

Dr. W. R. BIRDSALL: The discussion of this subject involves a good many intricate questions. Now perhaps a few examples of the way in which physicians use the term "irresistible impulse" would be better than an attempt to define, in a few words, the term as used.

Take the case of a man who has grown up in the community and has learned to drink, or of a man who has formed licentious habits; they do not necessarily indicate disease. Because a man does not represent a high ideal of moral development, we cannot consider his case from a standpoint of disease, if surrounded by ordinary circumstances; but there are persons who, from the earliest period of their lives, have a condition which prevents the full development of their moral qualities, in whom we find intelligence, but in whom a higher species of development of the mind is not apparent,—in whom the moral idea is defective and remains so through life. A majority of these people, I believe, are hereditarily defective, and these tendencies show themselves in the later periods of life, when, although the person may thoroughly understand the difference between conventional right and wrong, he may develop the lowest possible moral tendencies. I think it should be recognized that we have among us indi-

viduals who are on this plane of development. You may convince a certain individual that punishment will follow the commission of crime, but if that individual persists in performing such acts, it is more a matter of policy than it is a matter of morality with him, because he has no moral development; and we often see this tendency in an early age, where brutal propensities are developed. Now, as to what should be done by the community with such people is entirely another question.

Certainly the fear of punishment may go a good ways in deterring a man, but it has no effect on his morals, but merely on the purely animal propensities, and it seems to me that we have a very grave question before us, as to what we ought to do with such people.

That class of men are certainly dangerous to the community, but the question is: How shall the community be protected from these people—shall we destroy them or place them in an institution for life? It seems to me to be a mental condition in which the moral faculties are in an undeveloped condition. We have a brutal disposition, brutal because it lacks the morality of the average human being; consequently such individuals should be kept apart from the community. A homicidal act may be committed by persons laboring under acute forms of insanity which certainly result in recovery,—individuals who never show such a tendency again; but cases where we cannot trace hereditary tendencies of a similar nature, or where, from infancy up, the person has shown these peculiarities, it seems to me that they should not be destroyed, but that society should protect itself by confining them in suitable asylums for such people.

Now, as to the dividing line between sanity and insanity, we have none. We may choose an arbitrary standpoint, but nature never makes any line between the two. It seems to me, there always will be difficulty in determining these points; and no matter how we may fix the law, decisions must be rendered according to the facts of each individual case.

RICHARD B. KIMBALL: If we are not wandering altogether from the subject, we are certainly getting a good way from it. The more I consider the question—I am

speaking of the President's able paper—the more it seems to me to bristle with difficulties; that is, when we propose to disturb the law which defines what sort of persons shall be subject to judicial punishment for crime or misdemeanor. There need be no dispute between the medical and legal gentlemen as to what insanity is. The lawyer may refer the whole matter to the alienists, and let them explain all about insanity to the border line, as they term it, and as much further as they choose to go, even to the pronouncing ninety-nine men of a hundred insane, as some have done. But we cannot permit these learned experts to disturb by their theories the carefully considered statutes which declare who shall be held responsible for their acts, at least not until a better law is formulated and ready for acceptance. A great deal of discussion has been going on lately, to little or no effect. The important question is: If the present statute is repealed, where will you mark the line between responsibility and non-responsibility for actions and conduct? It is easy to pull down, are we ready to rebuild? It is, no doubt, true that a person may commit a crime knowing it to be wrong and contrary to law, and be aware of the consequences, yet be, in a sense, insane. The wife of one of my college classmates was addicted for years to petty thieving. Her husband knew nothing of it till by chance he discovered two or three trunks filled with miscellaneous articles of every description, articles of not the least use to the lady and which she never did use. She was in other respects a most exemplary wife, and made for her husband, who was in easy circumstances, a happy home. Now, she was certainly insane in that particular. Suppose this person under certain explicable circumstances had committed homicide. No doubt, let us assume, existed about her knowing the wrongfulness and illegality and consequences of the act. What is to be done with her, if she is to be tried by a jury, or rather, commission, under the new dispensation, for she must certainly be declared insane, in view of the particulars I mention. Is she to be sent to an insane asylum, when she is as much deserving of the legal penalty, and as sane with regard to the crime as a human being can be? I repeat, the subject bristles with difficulties.

I beg, gentlemen, to understand that I consider this subject a most important one. I am ready to accept any wise modification of existing statutes on the subject, but I deprecate any flippant discussion which looks toward a violent disruption of a carefully settled law. Let us rather turn to the consideration of any proposed amendment which shall better define who shall be held responsible for criminal acts committed.

Ex-Chief-Justice SHEA : Mr. President—All persons who have professionally observed the course of the administration of justice, as some of us have for thirty years or more, must have some conceptions which are pertinent to the subject of the papers which we have heard read this evening. For myself, I have long been of the opinion—founded not without experience—that the Common Law, in relation to the responsibility of human being, for human conduct, discredits civilization. Whether a person is unsound in mental controlment, or is insane to such a degree that it is unjust to hold him responsible ; in either of such instances it would be adverse to the principles of jurisprudence and the object of legal punishment to allow the law to take its usual course as in cases of criminal malefactors. For the object of punishment is penitential, where the evil-doer can be reclaimed ; and the life of the criminal is taken only where the heinousness of the offence declares a depth of malignant intent beyond the power of reformation, and so that the criminal in a special degree endangers the safety of the community. To take life in any other than such a case is always a mere sacrifice to unreasoning and ignorant prejudice, and the object of punishment is not attained. The Common Law, not general jurisprudence, has always had a rule in reference to the responsibility of human beings for those human actions which affect the interests of the community. The law of right reason, however, has no such rule ; the law for probate of will has no such rule. In the law concerning competency to control that which is property there can be no fixed rule as to legal competency. Yet, whenever the Common Law deals with human accountability as to acts which the law of crimes punishes, it is that law alone which proclaims a fixed rule—an imperative maxim.

Mr. President: It is the Common Law that has a rule. Science itself is progressive, is ever on the inquiry, and, therefore, has and can have no fixed rule. • So that it is in medical science, and it should, therefore, be likewise in law, a question of fact whether a person accused is insane; and, like all other questions of fact, to be determined upon the evidence and by the verdict of a jury. Where the Common Law rule came from I know not. Little doubt it grew from some unfortunate precedent, not from any principle of general jurisprudence. In England, a senseless and harsh treatment has ever surrounded, in former times, the insane. The history of its old mad-houses, and, indeed, of our own, is no credit to intelligence or humanity. The madman was too often dealt with as if he were capable of self-control, but by great exertion of will; and he was imprisoned, beaten, and maltreated as if the misconduct was due to viciousness and wilfulness. This has been changed, but the Common Law rule still endures.

In the letter of Mr. Justice Matthews, which we have heard read this evening, he speaks of persons who are insane partially. I cannot understand that notion of a partial insanity. I can understand how there can be a collection of stagnant matter in some particular locality; but I know that the arising malaria spreads over the whole district. If we are to speak of the source of that malaria as local and partial, we are intelligible; but to speak of that malaria as of that spot alone, is not correct. A lame man is lame whether walking or not; the lameness is always with him—but the infirmity shows itself only when he moves. So people that are insane on one subject are always insane; the insanity shows itself to the observer only when the will affects that particular exciting cause; and that local infirmity subjects often the whole system of the unfortunate person.

We can use this illustration for a further aid. Where is the faculty in the mind itself that can be educed to prevent a morbid disposition toward the thing which excites the abnormal state? We are able to restrain a person from moving about if he is not willing to be quiet of his own will; but where is there a faculty in the mind—for the mind is beyond the physical control of other persons, and herein must

minister to itself—which we can bring to our aid? I know of none but that of early *charactered* habit. Therein lies the great benefit of a practical, moral, and religious early education, founded in habit, and not mere intellectual culture. That great moral education is found alone in the well-ordered and religious household—a father's example and teaching; a mother's love and inspiration. The school-room is secondary and subordinate to those natural influences. Sir James Macintosh has observed: that however correct our thoughts, we act according to our habit. Teach even the infirm mind good habits, and erratic thoughts are not likely to mislead; the force of habit is a stronger and second nature.

Dr. J. A. IRWIN remarked that Mr. Foster had asked the meaning of the expression "irresistible impulse," and had been answered by a gentleman whose definition could not be accepted as satisfactory, since it confused an "irresistible desire" with an "irresistible impulse,"—conditions of mind which should be clearly differentiated in measuring legal responsibility.

A *desire*, whether or not so strong as to be correctly termed irresistible, has always in view an end or gratification of some sort. It is so with the dipsomaniac and kleptomaniac. It is so in the crimes just alluded to, as in the kindred and still more detestable ones of *cunnilingus*, *irrumare*, *fellare*, and *coprophagia*; and thus in each case there is some responsibility, although in many instances it would be unjust to estimate it from the standard of normal intelligence and physique.

An "irresistible impulse," on the other hand, is the very essence of entirely irresponsible insanity. It is an unreasoning, unaccountable condition of mind which, without motive or expected pleasure of any kind, impels, even constrains, to some other desperate action.

For example, to kill a person whom one hates, or by whom one has been injured, may be the gratification of a *desire* so powerful that, opportunity offering, it was, for the moment, beyond the control of an ill-regulated mind; none the less the pleasure is enjoyed, the penalty is incurred, and should be inflicted. On the other hand, a murderous as-

sault by a previously respectable individual upon another who was a stranger to him, who had given him no provocation, and from whose death he had nothing to gain, can only be regarded as the outcome of the irresponsible and irresistible *impulse* of a lunatic.

Dr. Irwin expressed dissent from the views of the learned Judge who had just spoken, that erratic tendencies in the insane were usually the result of previous indulgence or ungoverned thought. Every physician of experience could cite numerous examples to the contrary.

Reviews and Bibliographical Notices.

Psychiatrie : Klinik der Erkankung des Vorderhirns.

Von Dr. THEODORE MEYNERT, K. K. Ord. Ö., Professor der Nerven-krankheiten und Vorstrand der Psychiatrischen Klinik in Wien. Wien, Wilhelm Braumüller 1884. Erste Hälfte.

Psychiatry: Clinic of the Affections of the Prosen-cephalon. By Dr. THEODORE MEYNERT, Royal Imperial Professor in Ordinary of Nervous Disease, and head of the Psychiatric Clinic in Vienna. Vienna, William Braumüller, 1884. First Half.

First Notice.

The present volume is by an acknowledged master of cerebral anatomy, and is an exposé of his doctrine that the pathology of insanity is a chapter in the anatomy of the prosencephalon. The subjects in the present segment of the work are: First: The form and relationships of the brain. Second: Anatomical corollaries and physiology of the brain. Third: The mechanism of the brain. Fourth: The mechanism of expression. Fifth: Review of prosencephalic diseases. Sixth: Clinical observations on prosencephalic diseases. It is needless to say that cerebro-anatomical subjects are most thoroughly discussed. Under physiology of the brain are discussed the relations of the mind to the brain. According to Meynert intelligence is not localized, the cortex as a whole being its seat. This section is a splendid presentation of the relations of the facts of consciousness to cerebral anatomy as understood at the present day. The chemistry of the brain is discussed at length. From a clinico-pathological standpoint Meynert divides the prosencephalic diseases into:

A. THOSE BASED ON ANATOMICAL CHANGES.

I.—Malformations of the skull and brain, well-checked intra-uterine, natal, or early childhood developmental processes.

Clinical Results : Imbecility, cretinism, deafmutism.

II.—From gross anatomical cerebral changes like hemorrhage, softening, tumors, sclerosis, syphilis.

Clinical Results : Delirium, paralysis, partial dementia, traumatic confusional insanity, symptomatic chorea, etc.

III.—Diffuse meningo-encephalic anatomical changes like cerebral hypertrophy, cerebral atrophy, hydrocephalus, meningitis, etc.

Clinical Results : Dementia, paretic dementia, senile dementia, delirium, basilar meningitis, acute mortal changes with chorea, epilepsy, hysteria, senile involution.

B. NUTRITIVE AFFECTIONS.

I.—Cortical irritable conditions.

a. Irritable emotional exaltation ; pure raving mania.

b. Primary melancholia;- depressed emotional conditions with inhibition of the will; ideas of self-littleness and self-accusations.

c. Primary mania, emotional exaltation, flights of ideas, and ideas of increased self-importance; chorea.

II.—Localized irritable weakness.

a. *Irritative states of the sub-cortical special-sense centres.*

General insanity.

Primary hallucinatory, confusional insanity.

Secondary, "with stuporose" and maniacal phases.

b. *Irritative states of the sub-cortical centres of general sensation.*

Hysteria, hypochondria.

Partial insanity.

Manie-raisonnante.

Persecutional insanity.

Megalomania.

c. *Affections of the sub-cortical vaso-motor centres.*

1. Hyperæsthesia.

Epilepsy.

Hystero-epilepsy.

2. Exhausting states of excitability.

Circular insanity.

Paralysis, ascending paralysis, morbus Basedowii.

C. TOXIC STATES.

It will be observed that these divisions are largely hypothetical.

The arguments in favor of them are logical and well worked out, but it must be confessed as a clinical classification this is too

cumbrous and confusing. Meynert differs, as most alienists will, from the dilettanteic psychiatrists who claim that delusions must originate in hallucinations or illusions. The work when completed will form a decidedly valuable contribution to the literature of psychiatry and will then be reviewed at length.

Psychological Medicine. By Dr. E. C. MANN. Philadelphia : P. Blakiston, Son, & Co., 1883.

The present rather portly volume is devoted not only to the subject of insanity, but also to "allied nervous diseases." The author is known to the readers of the *JOURNAL* through articles on the subject of insanity, and some of these are incorporated in the present work. The first part of the book is devoted to "Insanity in General : Its History and Classification," "Etiology of Insanity and Importance of its Repression in the Incipient Stages," "Prevention of Insanity," "Diagnosis and Prognosis of Insanity," "Civil Incapacity," "Legal Tests of Responsibility," "Hints for Giving Testimony," "Expert Testimony and the Functions of Experts in Insanity," "General Paralysis of the Insane," "Idiocy, Dementia, Folie Raisonnable," "Mental Responsibility and the Diagnosis of Insanity in Criminal Cases," "Histology and Functions of the Brain," "Pathology and Morbid Histology of Acute and Chronic Insanity," "Cases Illustrating Pathology and Morbid Histology of Insanity," "Treatment of Insanity," "Insanity in the Middle States," "Provision for the Chronic Insane," "Lunacy in England and Scotland," "The Necessity for a New Method of Introducing Expert Testimony in Criminal Trials where Insanity is Alleged as a Defence," "Codification of the Common Law as to Insanity." It will be obvious from these headings that the author's ideas of what is necessary in the arrangement of a work on insanity are in a decidedly confused state.

Dr. Mann in the first chapter cites a few classifications, but recommends none, and gives the impression to the student that the subject is of no importance. He seems to lean to the etiological classification of Skae. The remarks on etiology in the second chapter are based on the absurd "supposed causes," tables of asylum reports, and are therefore worthless. The remarks on the treatment of the incipient stages of insanity ignore facts which are now well recognized. The remarks on the prevention of insanity in the third chapter are less dilettanteish than those usually found under this head. Dr. Mann takes a very sound view of the evil influence of schools, but the chapter as a whole,

however valuable from a popular standpoint, takes up too much space in reiterating very trite opinions. Were the chapter on diagnosis based on a proper classification, it would be of value ; as it is, the student from the data given would not be able to demarcate states in which persecutory delusions occur from melancholia. The remarks on moral insanity are just, so far as they go, but they do not go far enough, since moral insanity is sometimes congenital as well as acquired ; the whole chapter is permeated by the change-of-character theory, which has worked such sad havoc in forensic psychiatry.

The section on prognosis contains many errors ; chronic hysterical insanity has not a good prognosis ; puerperal insanity is not, as a rule, caused by septicæmia. The meaning of the following sentence may be clear to Dr. Mann ; it is not to the reviewer. "The prognostic value of difference in the pupils in insanity is not great, according to most authorities, and does not seem to justify an unfavorable prognosis ; paralytic cases are excluded in these remarks." The distinction between the varieties of eccentricity, so dishonestly confused by the experts in the Guiteau trial, is well made by Dr. Mann. He accidentally omits to refer the entire description of one variety to its proper source—Bucknill and Tuke's work. The diagnostic remarks on hypochondriasis interlarded in this section are worthless, and the same is true of the remarks on monomania, which are based on exploded dicta. In the remarks on feigned insanity nothing is said as to simulation of insanity by the insane. Dr. Mann, unlike Dr. A. E. Macdonald, the only would-be alienist who makes such statements, admits that the insane can and do conceal their insanity.

The chapter on civil incapacity contains perfectly sound and just opinions which do credit to Dr. Mann's power of psychological analysis and sense of humanity. The chapter on general paralysis contains nothing new or newly put. Dr. Mann fails to recognize that pathological data indicate the vaso-motor nature of the disease.

The seventh chapter on idiocy, dementia, and *folie raisonnée* contains much of value, but the subject-matter of the chapter as a whole is badly digested ; through an error, possibly typographical, moral or affective insanity is used as a synonym for all three psychical states. The valuable article of Dr. Hughes on moral insanity is quoted in full. The eighth chapter might have been with advantage condensed into one with the fifth. It contains much truth put in a plain, practical way. Dr. Mann has evidently

never met with a case of transitory insanity, nor is he familiar with the literature, or he would not say: "There has been *petit mal* in nearly every case of transitory mania we have knowledge of." The ninth chapter is not brought up to date, and is useless. The tenth chapter contains no guide against alcoholic artefacts, and in fact describes such artefacts as pathological lesions. Dr. Mann is unacquainted with any researches on "*originare* Verrucktheit." This and the next chapter have already appeared in the 1877 volume of the JOURNAL. The last case cited is valueless; no psychical symptoms, of what would appear from the diagnosis to be an exceedingly rare case, are given. The chapter on treatment, so far as its original part goes, contains much common-sense, but the value of the chapter is marred by the citation of, what Luther V. Bell long ago showed to be worse than useless, asylum statistics. It is a well-established fact in psychiatry as in general medicine, that the more ignorant a physician the more "cures" he reports, simply because of erroneous diagnosis. It would show a more decided tendency to get at the true state of things were Dr. Mann to quote side by side with Dr. J. P. Gray's remarks on restraint and seclusion, what Dr. Bucknill says about restraint in the Utica Asylum in "Notes on Asylums in America." If Dr. Mann had confined his remarks on treatment to the citation of his own experience, his readers would have less reason to complain. The thirteenth chapter might as well have been omitted. It really gives no idea of the imperfect provision for the insane in every State mentioned. The fourteenth chapter is an imperfect rehash of the outcry for provision for the chronic insane, floating through medical literature for the past ten years. The same remark applies to the fifteenth chapter as to the thirteenth. The sixteenth chapter is a discussion of the question of expert testimony, but the remedies for the evils of the expert system are dilettanteish in character, and ignore the existence of the very potent "political machine," which makes out of very imperfect timber the average medical superintendent of an hospital for the insane. In Massachusetts it has appointed men like May, who seduced his female patients; in New York, men like the superintendent of the Auburn Asylum, who shot bullets into his patients; not to speak of the superintendents who get places by giving fraudulent health certificates to convicts with "influence," or the ones appointed to get rid of them as candidates for the Legislature. The section on nervous diseases is interestingly written, but is

seriously deficient in a knowledge of the more recent literature, and the chapter on the development of the nervous system needs rewriting under the stimulus of a better knowledge of comparative anatomy. The appendix on the laws of the various States is of great value. The appended bibliography is, like the work itself, in a decidedly confused state, and useless to the student. The present work, if cut down two thirds, if systematically arranged, if brought up to date in regard to most of the matters with which it deals, might be of value to the alienist. Dr. Mann can scarcely be said to have done well in so soon appearing before the public as an author. As it is, his enemies have certainly reason to be rejoiced at the fact that he has written a book. The reviewer, with high regard for the stand Dr. Mann has taken against popular prejudices in regard to questions where it would have been more profitable to have done otherwise, regrets, for Dr. Mann's own sake, that he should have published the present volume.

J. G. K.

First Report of the Committee on Lunacy of the Board of Public Charities of the State of Pennsylvania, Sept. 30, 1883, Harrisburgh. L. S. Hart, State printer, 1884.

This Committee on Lunacy consists of five persons, none of whom are alienists, and but one of whom is a medical man. This last gentleman has never been known other than as a surgeon, but it would seem that having married the daughter of a doctrinaire member of the Superintendents' Association this makes him, in the estimation of other doctrinaires, an alienist. The report is simply a statement of the act establishing this committee, and its rules and regulations. In the main, no objection could be made to the rules adopted, were they to be carried out by alienists, as by certain interpretations even the best rules become injurious. The thirty-sixth rule, that a copy of all the rules of the board are to be kept where the patients can have access to it is a decidedly diletante one, and cannot fail to work injury to the discipline of hospitals for the insane.

Medical Diagnosis, with Special Reference to Practical Medicine. By J. M. DA COSTA, M.D., LL.D. Sixth edition, Revised. Philadelphia. J. B. Lippincott & Co.

A book which has passed through six editions, and which during twenty years has been before the medical public, acknowledged as an authority, and appreciated to such an extent as to have made its translation into foreign languages a necessity, hardly calls for

an extended review at this late date. The present edition has, however, notwithstanding the brief period of time which has elapsed since the appearance of the fifth edition, been so enriched by the addition of new material, and by the insertion of new illustrations, that it is merely an act of justice to the author as well as to the publisher to call attention to these changes. The fifth edition contained sixty-one illustrations, and the present one contains sixty-eight. Among the seven new ones which have been added is one of the tubercle-bacilli in sputum, and one of the spirilla in relapsing fever. The number of new pages added is forty-three, and a great part of this new matter has been incorporated in the chapter on nervous diseases.

Among the new matter added to this chapter is, on page 64, a short description of "Allochiria," and the author, with his accustomed discrimination between accepted facts and theory, makes no attempt to enter upon an explanation of the phenomenon. Upon page 84, in speaking of degeneration reaction of muscles, he introduces the following important statement: "It may be so modified as to be abnormally slow to both kinds of electrical nerve excitation and to faradaic muscle excitation." This is a point which in the electrical diagnosis of certain affections becomes very important, as, for instance, in the rapid atrophy which frequently invades the extensor groups of muscles after a preceding affection of the corresponding joint. Upon page 116 attention is called to the fact that the average duration of bulbar paralysis is from one to three years.

On page 165, in speaking of aphasia, Wernicke's two centres of speech are explained. On page 178 a form of cramp, resembling writer's cramp, and occurring in photographers, caused by the turning of plates, is mentioned. This form of cramp occurs quite frequently; we have within the last year seen several cases of it. On page 186 a short account of Thomsen's disease is given. There are also in this chapter several additions which have been accepted as facts upon a too slender support. For a book of this kind upon medical diagnosis, where the assertions must necessarily be dogmatic, and space cannot be given to arguments pro or con, it would be well to exclude all doubtful points. This, as above mentioned, has been carefully done in the vast majority of instances, still the following assertions can hardly be accepted as acknowledged facts. On page 61, in speaking of the hemianæsthesia of hystero-epilepsy: "The degree of deafness corresponds with that of cutaneous insensibility." On page 86: "The knee-jerk is increased in unilateral convulsions."

On page 125, under the symptoms of locomotor ataxia : " There are also at times attacks of laryngeal spasms in ataxics, and *falling out of the teeth without caries.*" On page 161 : " Prolonged somnolence is also among the *marked* symptoms of cerebral syphilis." On page 172 : " Epilepsy is *often* found in connection with ear-disease, and especially with purulent otitis."

Owing to these and other additions this chapter is now particularly complete, and if any distinction can be made is probably to be considered as the best in the book. No person can study this chapter without having his diagnostic faculties sharpened by it. We purposely make use of the word "study" in this connection, for the entire book must be studied, it cannot be read. The publishers also are to be congratulated upon keeping their work so thoroughly in harmony with that of the author.

G. W. J.

Sexual Neurasthenia (Nervous Exhaustion). Its hygiene, causes, symptoms, and treatment ; with a chapter on diet for the nervous. By GEORGE M. BEARD, A.M., M.D. (Posthumous manuscript) edited by A. D. Rockwell, M.D. New York : E. B. Treat. Pp. 270.

Dr. Rockwell, in the preface of this work, pays a well-merited tribute to the unusual intellect of Dr. Beard, and reviews the origin and history of the word neurasthenia. After an introductory chapter which treats of nervous exhaustion in general, the book enters upon a consideration of the nature and varieties of neurasthenia. After thus, through various chapters leading up to the subject-proper, we find chapter iv. devoted to sexual hygiene, chapters v. to diagnosis and prognosis, vi. to illustrative cases, vii. to treatment, and chapter viii. is, so to say, an independent one, devoted to diet for the nervous.

That Dr. Beard's reputation has in any way been enhanced by the publication of this book would be an amount of praise which cannot conscientiously be accorded to it. Beard has written and spoken so much upon the subject of neurasthenia, that even when we are given an entire book upon one subdivision of this affection we, *a priori*, hardly expect to derive much new information from it. But, nevertheless, when we have read the 270 pages which it contains we are inwardly surprised at having obtained so little.

The entire work, however, forms very interesting reading matter,—necessarily so, for every page bears the impress of Beard's peculiar style. When we have finished reading the book, and we

have done so almost before we are aware of the fact, we come to the conclusion that it could have been very much condensed by the editor without detriment to the facts or theories therein developed. The Germans, with whom the writings of Beard have found great favor, have also, within the last few years, described a "depressive neurasthenia," or a "neurasthenia through loss of semen," which is their equivalent for Beard's "Sexual Neurasthenia." None of their descriptions have exceeded the length of a medium-size journal article, and, nevertheless, clearness of expression and a thorough comprehension and elucidation of the subject are not lacking.

The chapter upon treatment and that upon diet for the nervous contain some good suggestions.

Hand-Book of First Aid to the Injured. Prepared at the request of the Society for Instruction in First Aid to the Injured by BOWDITCH MORTON, M.D. Published by the Society, 6 East 14th St., New York, 1884. 16mo, pp. 90.

This little manual is the hand-book of the Society for Instruction in First Aid to the Injured, organized in this city some three years ago. Its object is to teach all classes of people what to do, during that trying period before the arrival of the physician, for the injured and those taken suddenly ill, and also to teach the rudiments of nursing and hygiene.

After a preliminary chapter giving an outline of the structure and more important functions of the body, the management of the various emergencies, both medical and surgical, is systematically set forth. The last chapter is occupied by a number of useful hints on nursing and hygiene.

A noticeable feature of this manual is the classification of the subjects in such a manner as to present to the learner a series of groups of emergencies which may be managed by the same general procedures. This thoughtful and logical arrangement relieves the untrained mind from the almost impossible effort of memorizing the special treatment for each case.

Another marked characteristic is its clearness and simplicity. Writing for the laity, the author has avoided all technicalities and medical forms of expression, which, although familiar to the medical man, are but poorly understood by the general reader.

His experience as lecturer and examiner for the Society seems to have enabled him to put much valuable and useful information into a form easily comprehended and remembered by every one.

Editorial Department.

LOCATION AND MANAGEMENT OF HOSPITALS FOR THE INSANE.

IN Volume X. of this JOURNAL allusion was made to the fact that hospitals for the insane are regarded as local improvements, and used to build up small towns. The following from the current dailies shows that this practice still continues. A new hospital for the insane was needed in Iowa: "The Governor originally appointed J. D. M. Hamilton of Fort Madison, George W. Bemis of Independence, and Dr. Kulp of Davenport, Commissioners to locate the new insane asylum provided for by the last Legislature. Atlantic and Clarinda are the chief contestants for the prize, and a sharp rivalry has developed. The Hon. Lafayette Young, acting for Atlantic, filed a protest against the commissioning of Kulp, stating in an affidavit that he "had distinctly pledged himself to Clarinda." Kulp filed a counter-affidavit declaring the statement false, and alleging that Young endeavored to influence him by offers of the support of a leading newspaper in any political aspirations he might entertain, to make him treasurer of the institution, and to do sundry other things for his benefit. After hearing the case the Governor concluded not to commission Kulp, and thereupon appointed ex-Senator E. J. Hartshorn of Palo Alto County. The row is very unfortunate, and the friends of Dr. Kulp say it is not ended yet." It is obvious that so long as there is not some central authority like the State Boards of Charities charged with the location and supervision of hospitals for the insane in lieu of local boards of trustees and

irresponsible commissioners, so long will scandals like that mentioned in the present citation occur.

RESPONSIBILITY FOR THE CRIMES OF "HARMLESS" LUNATICS.

THE ideas of some medical superintendents of insane hospitals as to what constitutes a harmless lunatic are decidedly vague. Even from hospitals for the insane epileptics, hallucinated lunatics, and delusional paranoiacs are discharged as harmless.

A lunatic, for example, escaped from a Western hospital for the insane, "who was undoubtedly insane, though seemingly in the full possession of his intellectual faculties. His insanity showed itself mainly in three ways : first, a delusion that he was the possessor of a great property ; second, a mania for writing love-letters and offering himself in marriage to all sorts and conditions of females ; and, third, becoming blasphemously abusive and dangerously violent on the smallest fancied provocation. He wrote bushels of letters, but his correspondence with females was finally checked, owing to complaints, as the letters were, as a rule, of a most obscene character, and most of them were addressed to women whom he had never seen, but whose acquaintance had been made through personals in newspapers. He had proposed marriage in all cases, and in some had been accepted, the filthy writing notwithstanding. In one addressed to a woman he said he was the father of seventeen children and was in a hurry to be father of more. This woman had sent him her photograph. None of his letters to women were fit for publication. He imagined every one was trying to rob him, and would begin suit on the most trivial cause if he could get an attorney to take the case. Despite the clearly indicated delusions of a character likely to lead to results disastrous to society, very little effort had been made to recapture him, as according to the superintendent he was not dangerous except where he fancied wrong was being done him." This man sued out a writ of habeas corpus, and the superintendent, without letting the question come to an issue, thereupon discharged him.

Concerning this class of cases Dr. Godding says : " But they say

he is harmless. Ah, given the insane mind and the impulse to restless wanderings, who, not able to look into that man's inmost thought, or assign a limit to that thought's vagaries, or foresee into what possible situation his travels may bring him, will dare to say he is harmless? 'Harmless,' when speaking of lunatics at large in the community, is a rash word to use." He cites various instances of "harmless" lunatics infesting the capital, and the recent history of one of the cited instances demonstrates the truth of these remarks. A daily journal says:

"It appears that the incarceration of Col. M. Pinchover in the hospital for the insane asylum was done to prevent a possible tragedy that would have been almost as sensational as the Guiteau crime. Pinchover has been a harmless crank in Washington for fifteen years. His delusion was that he had been cheated out of a seat in Congress, and that certain public men had robbed him of millions. Mr. Randall was one of these, and for him he had conceived the most violent dislike. One day he appeared in the east corridor of the House end of the Capitol just as Mr. Randall was entering. He immediately assailed Mr. Randall in bitter terms, becoming so frantic that he had to be led out. Friends warned Mr. Randall that, though Pinchover was looked on as a harmless lunatic, he might some day do him serious bodily harm, and on their advice he consulted Police-Surgeon Bayne. In accordance with a prearranged plan Pinchover was coaxed to police head-quarters, where a medical examination was held, and Pinchover sent to the government hospital for the insane."

These facts are so trite as to scarcely need repetition, but the question arises: Who should be held responsible pecuniarily for the results of the violations of law by this class of the insane? The discharge of an hallucinated lunatic, an epileptic lunatic, or a delusional lunatic of the kind mentioned from an hospital for the insane is a clear instance of malpractice, and the superintendent and managers of the hospital for the insane should be held responsible for it.

Periscope.

a.—ANATOMY OF THE NERVOUS SYSTEM.

ANATOMY OF THE CEREBRAL CONVOLUTIONS.—Prof. Eberstaller, of Gratz, (*Wien. med. Blätter*, 1884,) believes that the present classification of the cerebral convolutions takes too little account of the great variations presented. In a scheme of the brain surface it is necessary to include not only the sulci which are usually present, but also the variations frequently found. Believing in Gratiolet's maxim, that hastily drawn conclusions are dangerous to science, E. bases his conclusions on the observation of fifty male and fifty female adult brains, and further verifies them by examination of fifty adult and foetal brains, and the brain of an orang-outang.

The author lays much stress on the deep convolutions. As they can only be seen when the convolutions are sufficiently separated, a complete removal of the pia mater is necessary for their proper examination. They indicate that one sulcus is composed of several partial sulci, or that neighboring sulci have become irregularly united. The knowledge of the localities where deep convolutions are usually found gives us a key to the understanding of the variations occurring within physiological limits.

The author divides the interparietal sulcus into three typical parts, an anterior transverse, a posterior transverse, and a sagittal portion. The posterior transverse is the analogue of the ape fissure; it is the *fissura perpendicularis externa* of the primate brain, and therefore the, always present, anterior boundary of the occipital lobe. The prolongation of the parieto-occipital sulcus far outwardly is a peculiarity of the anthropoid brain, and therefore in man a mark of lower development. On the other side, the increased size of the inferior parietal convolution is a mark of high development.

The occipital lobe also possesses a constant boundary line inferiorly, the sulcus occipitalis lateralis. The parts below this sulcus belong to the temporal lobe. Between this sulcus and the ape fissure is the second bridging convolution of Gratiolet.

In one fifth of all instances the ape fissure divides this bridge, presses it down into a deep convolution, and terminates super-

ficially in the sulcus occipitalis lateralis. The thus lessened occipital lobe has few constant sulci. On this account its division into convolutions is difficult. Author finds here traces of three sulci.

The central sulcus, like the interparietal, has several parts—a median, lateral, and transverse. The horizontal part of the Sylvian fissure has not only an ascending but also a descending branch.

The author distinguishes three parietal arching convolutions: the anterior parietal (gyrus supermarginalis), central parietal (gyrus angularis), and posterior parietal, first found in the orang-outang, where it plays a small rôle, which contains the sulcus occipitalis anterior of Wernicke.

So the brain of man is distinguished from the anthropoid brain by the largely developed inferior parietal convolutions, as well as by the large size of third frontal lobe. These differences are brought by the author in relation with the power of speech.—*Schmidt's Jahrbücher*, 1884, No. 5.

NEW RESEARCHES INTO THE STRUCTURE OF THE BRAIN.—In a communication to the Academy of Sciences, July 7, 1884, (*Gazette Hebdomadaire*, July 11, 1884,) M. Luys gave the results of his examination of the brain, hardened after a new method. The brain is placed successively in solutions of bichromate of potash, carbolic acid, and methyl alcohol, and, on account of the consistency thus acquired, the various systems of white fibres can be distinctly isolated. L. thus succeeded in dividing the fibres in the centre of the brain into three systems.

1st.—The system of commissural fibres. These unite the symmetrical parts of the two hemispheres to one another; also unite the various parts of each hemisphere.

2d.—The second system L. terms cortico-thalmique. It consists of radiating fibres which bind the various territories to the optic thalamus. All these fibres converge toward the optic thalamus, the posterior being directed from behind forward, the superior from above downward, and the anterior, from a corresponding part of the cortex, from before backward. In order to reach their centre of convergence, the latter pass directly through the gray matter of the corpus striatum, dividing it into two segments. These are the fibres improperly termed internal capsule. The fibres of this system, soon after reaching their centre of convergence, are lost either in the gray matter of the thalamus or in the central gray matter of the third ventricle.

3d.—The third system, the cortico-striata fibres, as yet insufficiently described, consists of a series of fibres, having a common origin with the preceding in the different regions of the cortex, which enter into relation with the gray matter of the corpora striata, or the sub-thalmique ganglia.

These fibres have also a converging direction, and, where they closely embrace the outer side of the corpus striatum, are termed

external capsule. Their termination in the central regions is a matter of much interest. While a part of them is lost in the gray matter of the corpus striatum, others enter into the deeper ganglia from the red nucleus of Stilling to the nuclei of the olivary body. Hence it follows that the cortex is directly united, not only with corpus striatum and optic thalamus, but also with the whole series of small gray nuclei in the pons and medulla.

As to their physiological relationship, it may be said that : (1) the transverse or communicating fibres serve for the harmonious action of the homologous parts of the hemispheres ; (2) the cortico-thal-mique transmit in a centrifugal direction sensorial impressions from the optic thalami to the cortex ; (3) the cortico-striata fibres transmit excitations from the cortex in the psycho-motor territory to the corpora striata ; (4) as to the fourth system of fibres—the cortico-sub-thal-mique—its physiological rôle is as little known as that of the ganglia in which this system of fibres terminates.

THE CORPUS CALLOSUM.—Hamilton (*Edinburgh Clinical and Pathological Journal*, June 7, 1884) has given us some new views of the anatomical relations of the corpus callosum. The view generally accepted, that it contains commissural fibres connecting symmetrical part, of the two hemispheres, is almost altogether rejected by him.

His method of examination is as follows : Brain is hardened and then cut into perpendicular sections one half inch in thickness. These sections are frozen and the surfaces polished. He states that the course of the fibres is then marked out with almost the same clearness as the grain of a piece of polished mahogany.

H. states that the fibres of the corpus callosum, after they have arrived in the opposite side of the brain, pass downward, some into the internal capsule to become united chiefly with the optic thalamus, in small part with the head of the caudate nucleus, and perhaps in part with the pons and medulla ; others into the external capsule which pass later into the optic thalami, olfactory tracts, optic tracts, and temporal lobes.

These views, so contrary to what has been usually taught, and to what physiological considerations appear to demand, are not likely to obtain much credence.

STRETCHING OF THE SPINAL CORD.—Hegar (*Volkmann's Sammlung klin. Vorträge*, No. 239) made a number of careful observations on the cadaver to determine the effects of extension of the vertebral column etc., upon the cord and its membranes. He removed the posterior vertebral arch, and after studying the effects of extension upon the membranes, opened the latter for a more careful observation of the cord.

The following is a summary of his results. On forcibly flexing the spine anteriorly the membranes become flattened, and both

cord and membranes are stretched. Probably cord and membranes are equally affected. The prolongations of the dura mater afford the means of extension and counter-extension. The nerves and the brain are but little affected by the flexing of the spine. On the other hand, a considerable stretching of the nerves will produce a degree of tension in the cord even when the spine is in its usual position. The effect of such nerve-stretching is variable. But if the cord be already put on the stretch, through flexing of the vertebral column, then stretching the previously exposed sciatics, or even the bloodless stretching of the latter, produces a much greater effect on the cord. In this case the effect of the nerve stretching reaches, though to a lessened degree, to the highest part of the cord, and perhaps also to the brain.

The author believes it would be well to test the value of stretching of the cord as a therapeutic measure in disease. He thinks it would at least be justifiable to try it in those cases where nerve-stretching has hitherto been tried. The object of such treatment would be to set up a curative action through changes in the nutrition, circulation, or function of a part.

The manner of operating suggested is as follows. The force may be applied especially to the upper or lower part of the spine, according as we wish to cause a greater stretching of the upper or lower part of the cord.

In the first instance, the patient being seated on the table with the knees extended, the head and breast will be forcibly flexed toward the lower extremities. To this forcible extension of the spine may now be added the bloodless stretching of the sciatic nerves, through flexing the legs strongly at the hip-joints, the knees being still held in an extended position.

In the second instance, the force is applied directly to the lower part of the spine. The patient lies flat on the back. The knees being extended, the legs will be lifted toward the breast until the hip-joints are strongly flexed.

It may be necessary to practise these procedures some time before succeeding in producing sufficient extension to be of practical consequence. Very great extension is probably not without danger.

PHILIP ZENNER, M.D.

b.—PHYSIOLOGY OF THE NERVOUS SYSTEM.

THE FUNCTIONS OF THE CEREBELLUM.—Prof. Luciani has made a series of experiments upon this subject. The animals used were dogs. He kept alive a dog for eight months in which he had almost completely removed the cerebellum.

At the post-mortem the flocculi, the truncated peduncles, and the degenerated remains of the inferior vermiform process were the only portions to be seen. There were three periods in the phenomena presented by this animal. Immediately after the operation there was inco-ordination of all the voluntary move-

ments, so that the animal could not stand, walk, swim, or feed itself. Every attempt to move threw the anterior limbs into a state of tonic extension, and caused strong contraction of the extensors of the vertebral column, and of the head, with tendency to fall backward. These symptoms are ascribed by Prof. L. to irritation arising from the injury, not to the loss of the cerebellum.

About two months after the operation, the second period of the phenomena began and lasted about four months. The inco-ordination disappeared altogether in swimming, and a special form of ataxy showed itself in standing, walking, and isolated voluntary acts. The muscular movements lacked steadiness and force, and there was a constant clonic motion, but not so much as to prevent the performance even of intentional acts. When the power of walking was first regained, the animal would fall after a few steps. Later a fall was avoided by spreading out the paws. The essential condition in the cerebellar ataxy appeared to be lack of tone and deficient muscular energy. The third period, lasting about two months, was characterized by nutritive disturbances, as suppurative inflammation of the middle and external ear on both sides, with catarrhal conjunctivitis, due, in part at any rate, to external irritants. Rapid failure of nutrition ensued, at the end marasmus. After death all the remaining portions of the nervous system were found to be perfectly normal. In another dog he removed the right half of the cerebellum. Afterward he extirpated the sigmoid gyri. After this operation the left half of the cerebellum was removed. The extirpation of the sigmoid gyri caused a greater amount of paresis of all the limbs than occurs from the same cause in dogs having the cerebellum uninjured. From these facts Prof. Luciani draws the conclusion that the cerebellum does not lie in the path of the centrifugal fibres from the brain to the spinal cord, that the inco-ordination is due to the irritation of the peduncles, and that the ataxy represents the disorder due to loss of the cerebellum, that the function of the cerebellum is not to co-ordinate movements, whether co-ordination be understood as an elaboration of voluntary impulses, or as a reflex muscular adaptation. According to him the cerebellum "is a central organ on which depend the tone and a great part of the disposable nervous energy of the motor elements of the muscles." He also discovered that each half of the cerebellum influences both sides of the body. Prof. Luciani holds that the cerebellum is an organ, physiologically one, that it is not, as Ferrier holds, a complex of several organs.—*London Med. Record*, June 16, 1884.

SECONDARY DEGENERATION OF NERVE-TRACTS FOLLOWING REMOVAL OF THE CORTEX OF THE CEREBRUM IN THE DOG. —Messrs. Langley and Sherrington have made an examination of the nerve-tracts in the dog of Prof. Goltz. The extent of removal of the cortex is detailed in a previous number of the JOURNAL. In this dog the cortex of the cerebral hemispheres had been removed

unequally on the two sides and at different dates, and they hoped that a comparison of the degeneration on the two sides of the cord might lead to some conclusion as to whether removal of particular portions of the cortex caused degeneration of particular parts of the lateral pyramidal tract of the spinal cord. It also seemed desirable to determine whether secondary degeneration had occurred in all parts of the crusta and pyramids, or in certain parts only. In the crusta above the pons, most of the bundles of nerve-fibres showed marked signs of degeneration, although there were many normal nerve-fibres throughout. No distinct degeneration was seen in the mesial or meso-ventral bundles. In man lesions of the motor area of the cortex are commonly described as causing degeneration in, roughly speaking, the central part of the crusta. A comparison, then, of the degeneration occurring in the dog with that occurring in other animals after injury to the cortex, renders it probable that the mesial, central, and lateral parts of the crusta, so far as they are in trophic connection with the cortex at all, are connected respectively with its anterior, middle, and posterior portions. In a transverse section carried through the anterior portion of the pons, the number of normal nerve-fibres in the crusta was much less both relatively and absolutely than in the previous section above the pons. This confirms the description of Flechsig and others that the mesial bundles of the crusta are not continued downward in the anterior pyramid.

Their results were mainly as follows: In the crusta just above the pons, the lateral and central portions were partially degenerated; the mesial and meso-ventral portions were normal or nearly normal. Probably the mesial, central, and lateral portions of the crusta are connected respectively with the suborbital lobe, the sigmoid gyrus and adjoining region, and some part of the cortex posterior to the sigmoid gyrus. The whole of the right anterior pyramid was markedly sclerosed; the mesial portion being least, the ventral portion most, sclerosed. The subolivary tract was normal; it cannot then be in direct continuation with the dorsal part of the crusta; in the decussation its fibres become placed lateral to the pyramidal fibres; the two sets cross over together throughout or nearly throughout the whole region of the decussation. The transverse area of the sclerosed region diminishes considerably in passing through the pons, and in the decussation of the pyramids. The sclerosis can be traced in the lateral pyramidal tract on each side of the cord as far as the upper part of the lumbar region; throughout the sclerosed area are many normal nerve-fibres. The patch of greatest sclerosis is on the left side of the cord, and is placed more ventrally than the patch of greatest sclerosis on the right side. Not improbably the dorsal part of the lateral pyramidal tract is connected with the cortex posterior to the sigmoid gyrus. In addition to the secondary degeneration of the sclerosed area, there is apparently a "tertiary" degeneration of some fibres of the anterior and antero-lateral columns, especially those of the median portion of the anterior columns.—*Journal of Physiology*, vol. v., No. 2.

THE TEMPERATURE-SENSE.—The relative sensibility to heat of the skin in different parts of the body has not yet been determined. Dr. S. Pollitzer has made several experiments upon this subject. In all previous experiments the tactile impressions are complicated with the thermal. The sensibility of a part is determined by the intensity of the smallest stimulus required to evoke a sensation. That part is the most sensitive which can appreciate the smallest quantity of heat, and to determine the relative sensibility in different parts of the body it is necessary to determine the smallest quantities of heat which the different parts can appreciate. He used as a source of heat a modified Paquelin cautery, the "button" being moved slowly toward the skin by means of a rack and pinion. In his experiments, the temperature of the source of heat is practically constant, the part examined and the heated surface itself are sheltered from accidental currents of air by the use of suitable screens, the effects of convection of currents of heated air are entirely eliminated by having the heated surface always vertical over the part examined, the thermal sensations are uncomplicated by any sensations of touch, the parts of the skin examined are always of exactly the same extent of surface. Though absolute reliance cannot of course be placed on the result of observations on half a dozen individuals, the following conclusions are given:

(1) The relative sensitiveness to heat in different parts of the body is not the same in different individuals. (2) It differs much less in different parts of the same individuals than the sensitiveness to pressure or power of localization, the greatest difference for heat being as three to one, while for pressure it is at least as five to one, and for localization as sixty to one. (3) The parts in which the other cutaneous senses are most acute are not the same as those in which there is greatest sensitiveness to heat. (4) Of the parts examined, the tip of the index finger is the least sensitive; in the other parts, where the sense of locality is from five to thirty times as dull, the thermal sense is two or three times as acute. (5) The thermal sensitiveness bears no definite relation to the thickness of the epidermis. He also discovered why the back of the hand has been generally regarded as more sensitive to heat than the palm, because a thermal stimulus will give rise to a sensation sooner in it. He also explains that when the hand is immersed in warm water its dorsum is first affected, but after a while the palm feels hotter. It is because though the latent period of the palm is greater, its sensitiveness is also greater, than that of the back of the hand. It takes the stimulus longer to affect the palm, but when it does reach the temperature organ it affects it the more powerfully.—*Journal of Physiology*, vol. v., No. 3.

THE CEREBRAL CIRCULATION.—Under the direction of Prof. Morselli, Drs. Bergesio and G. Musso have made experiments upon a patient who had lost a portion of his skull. They used the

method proposed by Mosso, and studied the effect of drugs upon the brain.

Morphia and alcohol caused cerebral congestion. Paraldehyde was followed by an anæmia of the brain.

These agents do not cause sleep by any effect upon the cerebral circulation.—*Lo Sperimentale*, Tomo liv., Fascicolo 9, 1884.

ELECTRICAL OLFACTION.—Herr Aronsohn has made a series of experiments upon this point. He filled the nose with an indifferent fluid, and conducted through it to the olfactory nerve a constant current of small intensity, one electrode being inserted into the nostril, and the other on the brow. The most suitable fluid was a 73-per-cent solution of chloride of sodium warmed to about 38° C. He found that olfaction occurred only by variations in the current, sometimes by closure, and at other times by the opening, of the current. The reaction-laws of the olfactory nerve are as follows :

1. The kathode-olfaction ensues only by closing of the current, not by the opening.
2. Anode-olfaction occurs only by the opening of the current, not by the closing.
3. Anode-olfaction by the opening of the current ensues the stronger the current and the longer it is turned on.
4. The reaction corresponding to the anode is, other things being equal, weaker than that of the kathode.
5. The olfaction caused by the opening of the anode disappears through closing of the anode.
6. The reaction of both anode and kathode increases with the strength of the current.

The quality of the olfaction does not depend on the direction of the current. The laws of the olfactory nerve coincide nearly completely with those of the acoustic, and with the contraction-laws of motor nerves as described by Pflüger.—*DuBois' Archiv.*, 1884, 4 and 5 Heft.

THE RELATION OF THE NERVES OF THE SKIN TO RESPIRATION.—Herr F. Falk has studied the effect of thermic irritation, ducking, and of cold affusion upon the movements of respiration. He recommends that in cases of asphyxia the cold affusions, to be of use, should be applied to the breast, or better, to the neck. Cold applications to the breast show that either directly or through vaso-motor influences the heart is excited into considerable activity. To demonstrate the action on the heart he used an acupuncture-needle, and these conclusions are from experiments on asphyxiated animals. The action on the heart is especially marked, the more the coverings of the chest, as skin and muscles, are removed before the affusion. Cold applications to the neck act best upon the respiration. They produce an inspiration, and

this is more marked when the soft coverings of the skull are previously removed, for the irritation of the medulla oblongata is more intense.—*DuBois' Archiv.*, 1884, 4 and 5 Heft.

ISAAC OTT, M.D.

c.—GENERAL PATHOLOGY OF THE NERVOUS SYSTEM.

KAKKÉ : A DISEASE OF JAPAN.—Dr. Theobald A. Palm, in a thesis presented to the University of Edinburgh, has made an interesting study of the above-named disease, of which we present a summary from the *Edinburgh Clinical and Pathological Journal*, three numbers of which are almost entirely devoted to it. The resemblance of the disease to beri-beri, and to the cases of multiple neuritis reported by several foreign observers, and also more recently by Dr. S. G. Webber, of Boston, (see "Trans. Am. Neurological Association, '84, July No. of the JOURNAL,) make it a subject of interest to neurologists. Of the cases observed by Dr. Palm many presented the following symptoms : "They complained of numbness in the lower extremities, which they generally described as a feeling as if a thin tissue paper were spread over the skin, of slight loss of power in the legs, showing itself by inability to walk any distance without inordinate fatigue, a tendency to stumble and for the knees to give way. They experienced a difficulty especially in going up stairs, and sometimes in holding the thong of the wooden clog usually worn by the Japanese, which passes between the great toe and the next. Some patients drop the foot in walking, showing a paralysis or paresis of the flexors of the foot and extensors of the toes. When the foot was planted evenly on the floor they had little or no power to raise the toes from the ground, or if they could raise the toes, little force was required to press them down. They had also a trace of œdema over the tibiæ or about the ankles. In many cases there was tenderness of the muscles of the calf, which were in some instances hard and swollen, in other cases abnormally flabby and apparently partially atrophied. In almost all of these patients there was an absence or marked diminution of tendon reflex at the knee. Beyond the above symptoms they seemed to be in average good health. Some of them complained of vague, dull pains in the legs. * * * In the majority of cases the symptoms are not confined to the lower extremities. Numbness occurs in other parts, most frequently in the finger-tips, the hands, and forearms, and this is accompanied by some loss of motor power in the hands. The slightest degree of anæsthesia may occur in the abdomen or face. Œdema may also appear in the face. Palpitation of the heart occurs upon slight exertion, or palpitation of the abdominal aorta, and there may be the appearance of serious illness with pallor, or the patient may appear in normal health." The cases are generally chronic, many having previously suffered from the same disease. Their

course is generally favorable under tonics and faradisation. Acute cases are met with however, some of which result fatally. Such cases were rare in Dr. Palm's experience, but he quotes Dr. Anderson's description of this form of the disease as it occurred in other parts of Japan: "In the acute form, the grave symptoms may appear without warning, nearly always developing in the course of sub-acute or chronic attacks. A patient comes under treatment for *kakké* of apparently an ordinary character; he is usually strong and well nourished; has no sign of anæmia, and little or no œdema; the disease progresses in the usual manner, and no evil is anticipated, when suddenly rapid action of the heart, strong pulsation in the neck, and difficulty of breathing appear, with a distressing pain in the abdomen; soon afterward the patient vomits, and while an observer unaccustomed to see the disease still apprehends no danger, the Japanese doctor recognizes the commencement of the '*Schiyōshin*' (signifying embarrassment of circulation and respiration), and predicts that the man will surely die. During the next few hours the breathing becomes more embarrassed, the pulsations of the heart more and more accelerated, and vomiting occurs from time to time. The patient can now lie down no longer; he sits up in bed, or tosses restlessly from one position to another; and with wrinkled brows, staring anxious eyes, dusky skin, and blue parted lips, dilated nostrils, throbbing neck, and laboring chest, presents a picture of the most terrible distress that the worst diseases can inflict. There is no intermission even for a moment, and unless active treatment be at once resorted to, the pulse fails, the temperature sinks, and at length the brain, paralyzed by the carbonized blood, becomes insensible, leaving the dying man to pass his last hours in merciful unconsciousness." Dr. Anderson adds that all acute cases are not as terrible as this. The difficulty of breathing and cardiac disturbance may exist for two or three days, and if taken as a warning in time the difficulty may be arrested. In an analysis of the symptoms, Dr. Palm states that anæsthesia of the skin is almost invariably present, is never complete, and is always localized, and is symmetrical. It always commences in the lower extremities, where it persists longest; tends to spread upward to thighs and abdomen; often appears in the finger-tips and hands, or around the mouth; and in other situations than the legs is fugitive in character. He quotes Dr. Werniche as stating that analgesia is present in twenty-five per cent. of these cases; sense of locality, tested by Weber's method, in most cases not sensibly diminished. Diminution in the sense of pressure was noticed in six per cent.; in the sense of temperature, in eighty-two per cent. The special senses are not affected, except that the taste may be somewhat diminished. There is no hyperæsthesia, except tenderness of the muscles.

The loss of motor power is a constant symptom, commencing in the lower extremities and chiefly confined to them, never becoming absolute. The gastrocnemius and quadriceps femoris are most frequently affected. Paresis of the rectus femoris is shown by a

tendency to fall forward on the knees when bent, a sense of looseness in the knee-joint, and a feeling of concussion on the condyles when walking. Sometimes the muscles which flex the foot are weakened ; then the patient lifts the feet high to avoid dragging the toes, the work being thrown upon the flexors of the knee. Less frequently paresis appears in the upper extremities, often escaping notice, and even the vocal muscles are sometimes involved, articulation being interfered with. The sphincters are never affected. The degree of paresis varies ; some are able to walk with fatigue, others can only crawl or move their limbs in bed. In cases of long standing, atrophy and complete paralysis may ensue. Anderson found the average loss of power about fifty per cent. Symmetrical groups of muscles are affected. The muscles of the calf may be tense, swollen, and tender ; later they may become softer and flaccid. The atrophy is usually, though not always, recovered from. Dr. Palm found diminished excitability to faradism in the flaccid muscles. Dr. Anderson found the galvanic and faradic excitability of the muscles unaffected in the ordinary form, becoming enfeebled as atrophy advanced. Simmons and Werniche both obtained similar results. The latter observer found a brief period of increased excitability, corresponding to the recession of the œdema. According to Palm, muscular twitchings are often complained of, but no tremors or choreic movements. The patellar tendon reflex is almost invariably wanting. The superficial reflexes are diminished in proportion to the anæsthesia. No spinal pain or tenderness, nor well-defined girdle sensations, no cerebral symptoms, nor impairment of bladder or rectum, are evident. Cardiac symptoms were absent, or more or less trifling, in the more chronic and mild form of the disease. In the more serious forms, well-marked murmurs, degeneration of the muscular fibres of the heart, and dilatation of the organ appear. The condition of the arteries indicates disturbances of the vasomotor centres. Dr. Werniche's observations with the sphygmograph show in the more severe cases a pulse-curve, indicating great flabbiness and deficient elasticity of the arterial walls. The œdema is considered by Dr. Palm as a constant feature of the disease, though frequently slight and transient. It is an early symptom, appears first in the subcutaneous tissue of the front of the leg, pitting slightly on pressure ; like the anæsthesia and paresis it is symmetrical. It may occur in the face, giving it a round, full appearance. It is independent of cardiac, renal, and anæmic complications. It may become general, or affect the thoracic organs, resulting fatally. In mild cases, respiratory and alimentary affections are not present. Albuminuria rarely occurs, and the urine is otherwise normal, except diminished in quantity when the œdema is marked. All observers agree that the disease is not febrile, only trifling variations being observed. The records of the naval and military hospitals, according to Anderson, show that from 26 to 33 per cent. of the total land and naval forces are reported sick from this cause, varying at different stations. At one station, among 3,445 men, 1,844 cases of the disease appeared during the year.

In the Naval Hospital the relative frequency of the sub-acute, chronic, and acute cases were 67, 16, and 17 respectively. In the hospitals of Yedo, during 1875, in 402 cases, 89 (22.13 per cent.) deaths occurred. In the Naval Hospital the death rate was 5.8 per cent. from 1874 to 1878. Dr. Palm was unable to find a record of but five autopsies. He did not have access to Scheube's article, who, according to Webber, examined twenty cases, in all of which careful examination of the nervous system revealed neuritis in every case, and slight lesion, not sufficient to explain the symptoms, in only one case. In the five cases referred to œdema and serous effusions of various organs were found, and marked vascular dilatation of the small vessels in various parts of the body. In one case the brain and cord were not examined. In one of Simmons' cases, a small amount only of subarachnoid effusion of serum existed; the brain and membranes were otherwise normal. Microscopical sections of the cord appeared normal. In Dr. Anderson's case the membranes of the brain were somewhat congested, no effusions existed, nor abnormal appearance of the brain substance, except, on microscopical examination, capillary distension. Condition of cord similar to that of brain. Nerve-trunks of limbs normal. In Eldridge's case the meninges were congested, with an effusion of yellow serum beneath them and in the ventricles; cerebral parenchyma œdematous. Similar yellow fluid in spinal canal; membranes of cord normal, except intensely congested in lumbar region, where cord was softened and enlarged, microscopical examination showing great capillary distension and many small extravasations. Respecting etiology, Dr. Palm says: The season of prevalence of kakké is that of increased heat and moisture. In rainy summer it is especially frequent and severe. No connection can be established between any article of diet and kakké. It does not attack the very young nor the aged, chiefly those in middle age; women rarely suffer, except in the puerperal state. No cases have been known among foreigners resident in Japan. It seems difficult not to believe that their method of sitting (squatting) and walking acts as a predisposing, and possibly also as an exciting, cause of defective innervation of the lower extremities from continued pressure upon the nerves and interference with the circulation. Among exciting causes, exhaustion from overwork and exposure to wet and cold take a prominent place. Unusually prolonged standing and walking, working with the feet and legs in the water, appear frequently to determine an attack of kakké. According to Anderson, overcrowding and bad ventilation is a powerful exciting cause. On a Japanese vessel, seventy out of 300 seamen were affected, and twenty died. They slept with only thirty-two cubic feet of space per head, in almost stagnant air. Improved ventilation was followed by almost an immediate cessation of the epidemic. According to Dr. Palm there is no indication that kakké is spread by infection from one person to another. Kakké is entirely different, he thinks, from malarial diseases proper, in that it presents no fever, no periodicity, and that quinine has no decided effect upon the disease. He con-

siders that it is a sufficient explanation of the symptoms of kakké, without invoking malaria, to regard it as a primary functional paresis of the sensory, motor, and vaso-motor centres of the cord, caused by a combination of depressing influences, which may vary in different cases. He admits, however, that there is on the whole a presumption in favor of a specific poison. We add in conclusion that Scheube believes that the disease is due to a specific poison. Dr. J. B. de Lacerda claims to have discovered the bacillus of beri-beri, from which he has reproduced the disease in Guinea-pigs, and Dr. Simmons believes that kakké and beri-beri are identical. This is also the view taken by Scheube, we believe.

LARYNGEAL PARESIS, RESULTING FROM LEAD-POISONING.—O Séifert (*Berlin. klin. Woch.*, No. 35) reports three cases under the above heading. In the first case there was paresis of the *arytenoideus proprius* in a joiner aged nineteen, who had just recovered from lead colic. The second case, a varnisher, who had repeatedly suffered from lead colic and was affected with saturnine nephritis, resulted in œdema. On laryngoscopic examination the mucous membrane over both arytenoid cartilages appeared œdematous; the vocal cords even in deep respiration remained nearly stationary; the left vocal cord approximating the median line a trifle more than the right one. In phonation the vocal cords do approach each other, but fail to make their normal vibrations. The œdematous parts were scarified, and after the reduction of the œdema the hoarseness completely disappeared. The left vocal cord, however, remained nearer the median line on deep respiration. After death from uræmia, beside other changes the post-crico-arytenoid muscles were found to have undergone pronounced atrophy. In the third case all the interior laryngeal muscles of the right side were completely paralyzed, lead colic a year previous had been followed by repeated attacks of hoarseness, no pulmonary or lymphatic affections were evident.

W. Lublinsk, of whose abstract the above is a translation (*Centralb. f. d. med. Wiss.*, No 46), states that he has found in the examination of a large number of saturnine cases that the laryngoscope reveals in a considerable number of cases laryngeal paresis.

He makes the interesting remark, that only the adductors of the larynx are affected, regarding it as analogous to the extensor paralysis of the extremities. He believes that Séifert's third case only, belongs to lead paralysis.

HYPERTONIA MUSCULORUM PSEUDO-HYPERTROPHICA.—A. Eulenburg has observed a case of so-called Thomsen's disease in a male, æt. twenty-seven. He was healthy up to his twentieth year, and gave no history of inherited disease. The quadriceps and calf muscles were hard and rigid, and of excessive volume. The

mechanical contractility of the rigid muscles was diminished. Though the skin reflexes were preserved the patellar tendon reflex was absent on both sides. Westphal's phenomena of the paradoxical contraction (in ant. tibial) was developed by passive dorsal flexion of the foot. Rigidity and hypertrophy of the muscles were also present in the upper extremities (deltoid, triceps, extensors of the hands); sensibility remained normal. Retention, tenesmus vesicæ, and occasionally incontinence were observed. The direct and indirect excitability for both galvanism and faradism was decidedly reduced in the upper as well as in the lower extremities. Eulenburg regards it as dependent upon a profound inter-medullary neuropathy.—Bernhart, in *Centralblatt f. d. med. Wiss.*, No. 44.

SATURNINE ENCEPHALOPATHY WITH GENERALIZED LEAD-PARALYSIS.—Krönig (*Charité Ann.*, ix., S. 154) reports the case of a shoemaker, æt. twenty-four, who had had four severe attacks of lead colic with vomiting and constipation, and entered the Charité during the fifth attack with pronounced symptoms of chronic lead-poisoning. Shortly, he developed the status epilepticus with delirium and somnolence. At the same time there followed within a period of five days paresis of both lower extremities with loss of the knee phenomenon, weakness of the left deltoid, along with paresis of the extensor muscles of the left forearm, all the flexors and the triceps remaining unaffected. After the subsidence of the status epilepticus the paresis entirely disappeared, by a gradual process, with the exception of slight weakness of the extensors in the forearm.—Siemerling in *Centralblatt f. d. med. Wiss.*

CHANGE IN THE NEURAL APPARATUS OF THE INTESTINAL WALL IN PERNICIOUS ANÆMIA AND IN GENERAL ATROPHY.—Sasaki (*Virchow's Arch.*, xcvi.) reports the result of examination in a case of progressive pernicious anæmia in which marked changes were found in the neural tissues of the entire intestinal tract. The ganglion cells of the *plexus myentericus externus* were remarkably small and deformed, mostly without nuclei, many presenting a shining homogeneous sclerosed appearance. The nerve-fibres were small and finely granular. Between these structures at certain points were found small bodies resembling corpora amylacea, but failing to give the reaction of the latter with iodine. Sasaki considers their origin as undetermined, but suspects that they are the offspring of the nuclei of the neurolemma. The muscular layers of the intestine were atrophied, the villi of the mucous membrane were short and small. In a second case he observed fatty degeneration of the entire plexus of Auerbach, together with fatty degeneration of the muscular elements. The involvement of Meissner's plexus was less marked. The villi were of normal size but exhibited an opaque granular appearance. No

changes were found in the vessels in either case. Sasaki advances the view that the lesions found in the neural tissues constituted an independent affection, being the cause of the severe digestive disturbances and consequently of the anæmia observed during the life of the patient. Degeneration of the ganglion cells similar to those described, he found at the base and in the neighborhood of typhoid and tubercular ulcers but they were limited to the region locally affected. In a series of cases of general atrophy resulting from cancerous cachexia and phthisis no degeneration of the plexus was observed.—Stilling in *Centralblatt f. d. med. Wiss.*, No. 46.

W. R. BIRDSALL, M.D.

d.—MENTAL PATHOLOGY.

FUNDUS OCULI IN INSANITY.—Dr. J. Wigglesworth (*Brain*, July, 1884) concludes: First. That in insanity proper (including all forms other than parietic dementia) changes in the fundus oculi are found only in the small minority of cases, but when all allowance is made for changes depending on associated constitutional conditions, errors of refraction, etc., the number of cases in which a connection between the mental (cerebral) state and the accompanying change in the fundus oculi can be so much as suspected is very small. This might have been expected *a priori*, but Dr. Wigglesworth takes no account of the optic teratological defects sometimes present in paranoia and other degenerative psychoses. Second. That in insanity proper no connection can be traced between the condition of the fundus oculi and the patient's mental state. Third. That in the majority of cases of parietic dementia the fundus oculi presents a perfectly healthy appearance. (This was clearly pointed out by Spitzka—*JOURNAL OF NERVOUS AND MENTAL DISEASE*, April, 1877.) Fourth. That in a minority of cases clear and precise lesions are found. Fifth. That these lesions fall into two main classes, the one extending in the direction of slight neuritis, the other in that of atrophy. Sixth. That in the former the affection declares itself as a hyperæmia of the disc, the edges being softened and indistinct, so that in some cases they can be traced with difficulty or not at all; and that these conditions tend—if the patient live long enough—to be replaced by atrophy, so that at length complete disorganization of the nerve may take place. The changes are essentially chronic in their course. Seventh. That, though atrophy of the optic nerve may thus succeed to a slight interstitial neuritis, it is also not unfrequently primary at the disc. The atrophy may be complete, the patient becoming quite blind. Eighth. That the pathological basis underlying the appearances of slight neuritis may be broadly characterized as a tendency to overgrowth in the connective elements of the nerve, the trabeculæ not only getting greatly hypertrophied, but the neuroglia corpuscles also becoming very large

and numerous ; the parts thus grow at the expense of the nervous elements, which subsequently atrophy. Ninth. That in the cases of primary atrophy the pathological appearances eventually reached, though somewhat similar, may possibly take place in reverse order at the disc, the nerve-fibre being the first to dwindle, and the fibrous elements, trabeculæ, etc, subsequently taking on increased growth. Tenth. That in a considerable proportion of the cases in which atrophy of the discs is met with, spinal symptoms are prominent in the disease, these symptoms pointing in the direction of posterior or lateral sclerosis of the cord ; but that this connection is by no means invariable. Most of these somewhat awkwardly worded conclusions, in their essence, have already been anticipated in the article (*JOURNAL OF NERVOUS AND MENTAL DISEASE*, April, 1877) to which reference has already been made.

OPHTHALMOLOGICAL OBSERVATIONS AMONG THE INSANE.—
Dr. W. S. Little (*Medical and Surgical Reporter*, May 24, 1884) gives the following results of his examination of the insane and idiotic. Among the idiots and feeble-minded ophthalmoplegia externa existed in two cases ; ophthalmoplegia interna from centric causes was present in 17.4 per cent. of the males and 17.3 per cent. of the females. The varieties of pupil found were : maximum, 6.2 per cent.; minimum, 4.2 per cent.; unequal, 6.5 per cent.; hippus, 0.2 per cent.

Imbecility	{ high	grade	.	.	.	9.7 per cent.
	{ middle	"	.	.	.	14 " "
	{ low	"	.	.	.	12 " "
Idio-imbecility	.	.	.	.	.	28 " "
Idiocy	.	.	.	.	.	41 " "
Juvenile insanity	.	.	.	.	.	20 " "
Epilepsy	.	.	.	.	.	37 " "

The results among the insane were as follows : 154 males and 154 females were examined ; 43.5 per cent. of the males and 35.7 per cent. of the females presented pupillary symptoms. The varieties of pupil were : maximum, 11 per cent.; minimum, 12 per cent.; unequal, 14.6 per cent.; immobile, 1 per cent. The psychoses were : monomania, 16 per cent.; melancholia acute, 25 per cent.; melancholia chronic, 35 per cent.; paretic dementia, 100 per cent.; imbecility, 20 per cent.; chronic dementia, 39 per cent.; mania acute, 35 per cent.; mania chronic, 55 per cent.; mania recurrent, 50 per cent.; epilepsy, 66 per cent. These results are not as valuable as they would be were a better system of classification adopted, and the ophthalmological findings brought into direct relation with each psychosis.

UNRECOGNIZED EPILEPSY AS A CAUSE OF MELANCHOLIA.—
Dr. H. Hayes Newington (*Journal of Mental Science*, July, 1884) says that some years ago a lady came under his observation who was suffering from melancholia of the ordinary religious type. She was very gloomy, thin, and yellow, and had made two serious

attempts at suicide. Ordinary treatment improved her, and she seemed in a fair way to recover. But after getting to a certain point, the disease became stationary for several years. One day she had an epileptic seizure, followed by another. On enquiry it was found that nine years before she had, while standing on a friend's door-step, fallen insensible, and must have had an epileptic seizure then. The relatives had never recognized its nature, and had forgotten the fact until it was recalled to their observation by the later seizure.

PARETIC DEMENTIA UNRECOGNIZED BY JAIL PHYSICIANS.—The English Commissioners in Lunacy, (*Journal of Mental Science*, July, 1884,) in their report on the Lancashire Hospital for the Insane, say: "Among recent admissions is a man named J. W., received from Preston prison by order of the Secretary of State, suffering from paretic dementia with well-marked delusions. He complained to us of having been flogged in Lancaster Castle after his conviction, and the marks on his back, now becoming faint, show that his story is true. We can only suppose that the jail surgeon failed to recognize the man's insanity, some of the characteristics of which are now, and no doubt were then, dirty and destructive habits." The *Journal of Mental Science*, commenting, says: "Such an occurrence shows how necessary it is that prisoners, especially those whose mental condition should be the subject of accurate observation, should be under the supervision of medical officers thoroughly familiar with mental disease. It cannot be doubted that insane prisoners are sometimes most unjustly punished for breaches of discipline, but what is worse, others, awaiting trial, are not subjected to that thorough examination which would lay bare the mental disease which ended in crime, and thus wretches are punished for crime for which they are not responsible."

ACUTE MANIA IN A THIRTEEN-YEAR-OLD BOY.—Dr. S. A. Strahan (*Journal of Mental Science*, July, 1884) reports the case of a thirteen-year-old farm laborer, who had an insane heredity. Three weeks before coming under observation he was "strange"; he improved more or less for nineteen days, but became incoherent and violent on the twentieth day. He was well built for his age; the testes had not entered the scrotum. His pupils were unequal. He was restless, profane, and obscene. On the third day after admission he was lively, incoherent, and described himself as "damned well." His pupils became equal. He improved till the twelfth day; then relapsed. After eighty days' treatment he had fully recovered.

INCEST FROM RELIGIOUS COMMUNICATED INSANITY.—Liman (*Vierteljahrschrift für gerichtl. Medicin*, B. xxxvii., Heft 2) reports

the case of a forty-nine-year-old man who had committed incest with his nineteen-year-old daughter, thereby coming within the hands of the law and being referred to Dr. Liman for examination as to sanity. His wife, the mother of his eighteen children, at the time two months pregnant by him, made the complaint, and therefore gave details which left no doubt that her husband had, for at least two years, suffered from insanity with religious delusions. On examination the patient was found to have religious delusions and hallucinations. It had been revealed to him that from intercourse with his daughter would spring the everlasting son, who would free his family from sin. This divine command he obeyed. The victim of this religious delusion was a nineteen-year-old, very well-built, very stupid girl who did not realize the nature of the crime she had committed. She had not suspected her father's mental condition and was a stupid tool in the hands of a lunatic.

ASYLUM RECOVERY RATES AS TESTS OF EFFICIENCY.—Dr. T. A. Chapman (*Journal of Mental Science*, July, 1884) adopts, in determining this question, the classes of Dr. Thurnam: Class I. First attack and within three months. Class II. First attack above three and within twelve months. Class III. Not first attack and within twelve months. Class IV. Over twelve months, first or otherwise. He concludes, after an analysis of recent English statistics, that the gross recovery rate is quite useless as a gauge of the efficiency of an asylum, since: 1, the recovery rate varies directly as the proportions of classes I. and III.; 2, the recoveries in class I. vary directly (in such cases as can be analyzed) as the curability of the cases included in it; and 3, these results, based though they are on a very general analysis of cases and masked by some obvious and many suspected errors in the figures supplied, account for so large a proportion of the variations on the gross recovery rate that a complete analysis might be expected to so fully explain them that there would be a very narrow margin left due to efficiency. 4. That there is an appreciable presumption (not at all amounting to proof or demonstration) against the efficiency of large asylums. 5. That if there is not an absolute uniformity in the results obtained in different asylums in view of the different classes of patients treated therein, the results are much closer to such uniformity than the usually stated recovery rates suggest. It should be remembered that a novice superintendent of an hospital for the insane has for his first few years a very large recovery rate, while the recovery rate of an honest veteran superintendent is a relatively small one. It is a question of diagnostic skill. Pliny Earle has done good service in pointing the elements of error in recovery rates. As Dr. Fisher ("Report of the Boston Lunatic Hospital," April 30, 1884) says: "It is no doubt the 'personal equation' which determines the wide difference between recovery rates of different hospitals."

EXALTATION IN CHRONIC ALCOHOLISM.—Dr. B. B. Fox (*Journal of Mental Science*, July, 1884) concludes that: First, the insanity of chronic alcoholism is very frequently characterized by exaltation. Second, but these exalted delusions are common to various types of insanity, and are not therefore reliable as determining classification. Third, this exaltation in some cases possesses nothing to distinguish it from that of parietic dementia. Occasionally, too, the physical signs of the two diseases so far resemble one another that they can only be differentiated by the history and other circumstances connected with the case, and in some rare instances only by watching the course of the malady. Fourth, in chronic alcoholism delusions of exaltation are usually fixed, constant, and ineradicable. Fifth, this is in consequence of their dependence upon cerebral changes, the result of repeated hyperæmia. Sixth, little or nothing can be done for their removal. While Dr. Fox's paper is of value as calling attention to possible elements of error in differential diagnosis, it ignores the fact that since chronic alcoholism passes sometimes into parietic dementia, connecting links must exist. Dr. Fox also fails to recognize the fact that the exalted condition in hypomania closely resembles that of parietic dementia, and that hypomania can be produced by alcohol. He does not lay sufficient stress on the fact that parietic dementia delusions are shifting and variable in contrast with the fixed qualities cited as pertaining to chronic alcoholic delusions. The evil results of the dilettante teachings of Sankey and Blandford are evident in the stress laid on exalted delusions as a test for parietic dementia.

CARDIAC DISEASE AND DEATH OF THE INSANE.—Dr. S. V. Clevenger, Chicago (*Chicago Medical Journal and Examiner*, August, 1884), says that "cardiac failure, either through trophic changes in the heart itself, or the pneumogastrics, is a common cause of death in the insane."

KATATONIA, according to Dr. S. V. Clevenger (*Chicago Med. Jour. and Examiner*, August, 1884), seems to have its origin in the motor apparatus, and he is inclined to regard the stagy behavior and hallucinations of voices commanding rigidity as suggested to the mind by the forced attitudes, precisely as an excellent digestion and circulation suggests exhilarant ideas and causes one to see every thing *couleur de rose*. He has found urea secreted in abnormal quantity from two cases in the cataleptoidal stage. One case of katatonia followed typhoid fever; another a strumous condition; one was sunstruck before becoming katatoniac; one male and one female case were "peculiar" mentally from birth, the male upon admission showing phases of hebephrenia. He has noticed some of these patients complaining in the beginning of rheumatic stiffness of the joints before catalepsy and delusions

appeared. Katatonia seems to be allied etiologically to some muscular rheumatoid disease, though its origin may be in nerves or blood.

SEQUESTRATION OF THE INSANE AT HOME.—Dr. Parant (*Annales médico-psychologiques*, May, 1884) concludes: 1st. That it cannot be contested that people have a right to keep in a particular domicile insane members of their family, to care for them there, and even to sequester them, when they are not dangerous to themselves or society. He does not say who is to settle this question. 2d. In practice, treatment and sequestration of the insane at home presents numerous difficulties, and often is detrimental to the patients. 3d. Numerous examples show that sequestration of this kind is not only defective, but leads to abuse of the patient, and often to criminal results. 4th. Surveillance of the insane in private care should be as strict as that exercised over those in the hospitals for the insane. The insane at home, as a general rule, are much more likely to be subject to abuse, as being under much less surveillance than those in the worst hospital for the insane—more especially as relatives of the insane present peculiarities unfitting them for nurses.

CHRONIC INSANITY AND THE PSYCHICAL DEGENERATIONS.—Dr. Magnan (*Gazette des hôpitaux*, April 22, 1884) states that chronic insanity (*délire chronique*) presents the following characteristics: 'The affection has at first a period of incubation which often passes unperceived. The patient is sad; the external world affects him painfully, and he is victim of an anxiety which he cannot explain. Little by little his painful ideas take shape. Delusive conceptions arise and become systematized. He is now persecuted. The psychical phenomena pursue a progressive march and become more and more systematized, and across the domain of persecution ideas of satisfaction make their appearance, and gradually the persecutory ideas give place to those of importance, and the persecuted lunatic has delusions of importance. At length the patient's faculties become enfeebled, and in the general cerebral turmoil the delusions disappear, and the patient becomes a dement. This picture is an excellent one, except that in its first stage it does not go far enough, and in the last it goes too far. Dr. Magnan does not here describe a psychosis, but the evolution of systematized delusions, and the systematized delusion of grandeur sometimes passes through the converse stage to that which Dr. Magnan has described. Under the title of the psychical degenerations he describes a class of beings whose cerebral state is one of defect from their birth. Dr. Magnan says (in words of which the following previously written citation from an American author is a pretty literal translation) that, "in examining those defective states of the human mind which are the frequent manifestations of an hereditary transmitted taint, it is found that they may be ranged in a

serial chain, whose links are constituted by different forms of mental alienation merging insensibly into one another. One end of this chain is constituted by idiocy, the other by that perversion of the intellect called primary monomania (paranoia). On first sight these two conditions appear to be separated by an almost impassable chasm, and this from a psychological as well as from a strictly somatic point of view. No greater contrast could be exhibited within the walls of an asylum than by placing side by side an idiot and a lunatic with systematized projects and delusions: on the one hand, a state characterized by an utter absence of every higher mental co-ordination; on the other, one which exhibits intricate and varied associations of the mental mechanisms analogous to those of the normal mind." In these cases there are often noticeable marks which Morel called stigmata. At the bottom of the scale there are defects so gross as not to require citation,—microcephaly, macrocephaly, plagiocephaly, etc. These stigmata are in more or less direct relation to the mental defect, and diminish as the patient rises in the intellectual scale, and in certain hereditary lunatics (paranoiacs) they must be looked for. They are cranial and facial asymmetry, excessive prognathism, deformed ears, deformed teeth, pigmentation of the fundus oculi, etc. In these paranoiacs with, at times, surprising intellectual power, there exist strange intellectual defects. In many of these cases there occur impulses which have been elevated to the rank of monomanias, when in reality they are merely episodic phenomena of a constitutional defective condition. The following are the most common types: doubting insanity, agoraphobia, dipsomania, kleptomania, homicidal and suicidal impulses, belonophobia, onomatomania, arithmomania, zoöphilomania (anti-vivisectionist). The sexual anomalies are so frequent that for purposes of study he makes a special classification of them. 1st. The spinal cases: Here the reflex is simple; the genito-spinal centre of Budge is alone in play (onanism in the complete idiot). 2d. Posterior cerebro-spinal cases: The first reflex passes from the posterior cerebral cortex and abuts on the cord. A patient has a venereal spasm at the sight of any human being. 3d. Anterior cerebro-spinal cases: Here the point of departure of the reflex is from the anterior cerebral cortex; it is a sentiment, an idea, a penchant which may be affected. A young man in a condition of sexual excitement sees the bonneted head of an old woman, and this grotesque image obtains such a mastery over him, that unless he calls it up on the first night of his wedding he remains impotent. 4th. The psychical cases in whom sexual pleasure is not directly felt; the erotomaniacs, etc. In Dr. Magnan's opinion the victim of degeneration is not a lunatic properly so-called. In him the psychical phenomena are bizarre and obey no particular law. In these cases there is no period of incubation; the ideas of persecution and grandeur come out pell-mell. However, this distinction cannot be maintained. In decidedly degenerated cases the psychical phenomena have a regular evolution, and in vesanic cases allied to them the irregularity is marked.

PARETIC DEMENTIA.—The following table (Utica Asylum Report, 1883) is of value from an historical standpoint. It shows the number of paretic dementeds admitted to the Utica Hospital for the Insane during a period of thirty-three years, and the numerical relation between the sexes :

	Men.	Women.	Total.
1849	—	—	—
1850	1	—	1
1851	1	—	1
1852	1	1	2
1853	6	1	7
1854	4	1	5
1855	7	—	7
1856	2	—	2
1857	9	—	9
1858	4	1	5
1859	5	1	6
1860	9	—	9
1861	8	1	9
1862	7	—	7
1863	11	—	11
1864	15	2	17
1865	22	—	22
1866	10	3	13
1867	13	—	13
1868	22	—	22
1869	29	—	29
1870	17	2	19
1871	27	4	31
1872	17	2	19
1873	21	2	23
1874	17	—	17
1875	15	2	17
1876	16	1	17
1877	24	5	29
1878	17	2	19
1879	18	3	21
1880	26	4	30
1881	27	3	30
1882	27	4	31
Total	455	45	500

CHILDREN OF IDIOTS.—Certain developments during the past few years in the Department of Public Charities and Correction, New York City, have raised a question of some interest. An idiot girl in one of the Randall's Island institutions was found pregnant by, Commissioner Brennan stated, one of the male idiots. Owing to the failure to make a scientific investigation, the paternity of the child and its ultimate fate remain in doubt. Berkham (*Allgemeine Zeitschrift für Psychiatrie*, Band xxxvii.) has investigated the question of the capability of microcephalic idiots to propagate

their species. An imbecile man, married for some years to a healthy woman, did not have any family. A healthy man who married an idiotic wife had three children by her, two of whom are idiots. These cases support Vogt's views, that while female idiots may bear children, the males are very frequently incapable of begetting them. Marriages rarely occur between male half-cretins and healthy women, but are not uncommon between healthy men and semi-cretinous females who may happen to own a little property. Berkham has never seen the progeny arrive at maturity; if not still-born, the children usually die during childhood. The best-marked case of microcephalous idiocy on Randall's Island is sexually well developed, and there is no doubt that in his case paternity is possible. The results in the few cases cited by Berkham are supported by the researches of Monteyel, as to heredity in psychically degenerated families.

GLYCOSURIA IN PARETIC DEMENTS.—Dr. A. McL. Hamilton (*New York Medical Journal*, July 5, 1884) has had under observation a "hybrid" case of paretic dementia. "The disease began with embarrassment in articulation, pupillary alteration, tremor of the tongue, and finally of the whole body; then came the delusions of grandeur of the most extravagant nature, and he became salacious in the extreme. Nearly all the cranial nerves were affected. There were facial anæsthesia, impairment of smell and taste, and very curious vaso-motor changes, which consisted mainly in a discoloration of the skin of the left arm and hand. From time to time sugar was found in his urine, and this seemed to be the case after an attack of excitement." Dr. Hamilton examined twelve paretic dementia cases in the Poughkeepsie Hospital for the Insane, and found "a varying quantity of sugar in all of them." Dr. Hamilton states that several years ago he "found glycosuria in the early stages" of paretic dementia. Dr. Hamilton seems to be unaware of the fact that Lailler (*Ann. Medico-Psych.*, tome ii., p. 1, *et seq.*), Madigan (*JOURNAL OF NERVOUS AND MENTAL DISEASE*, April, 1883), De Wolf (*Journal of the American Medical Association*, vol. ii.), and Kiernan (*Detroit Lancet*, vol. vii.) have all called attention to this relationship between paretic dementia and glycosuria. Kiernan says that the apoplectiform and epileptiform attacks of paretic dementia are far from being exceptionally followed by glycosuria, but despite Dr. Hamilton's abundant material his researches do not cover this point.

RESPONSIBILITY OF THE INSANE.—Dr. O. Everts, (*American Journal of Insanity*, April, 1884,) before the association honored by the membership of Dr. J. Ray, enunciated the following views: An insane man's life is not more sacred nor more valuable to himself than is the life of any other man of equal capabilities and expectations, and until society has overgrown the necessity of suppressing any class of criminals by death, such of the insane as commit crimes

incurring such penalty, with knowledge and purpose, cannot be reasonably excepted from its operation. These views come with great propriety from a city where mob violence takes the place of law. Dr. Hammond, while enunciating similar views, admits that they are opposed to abstract justice and only justified by social necessity. Dr. Everts denies that executions are a necessity at all, yet says the insane should be hung. As Dr. Everts has been on several occasions the mouthpiece of Dr. Gray, it is fair to presume the latter is preparing to declare that society should hang the insane without going through the form of proving a non-existent sanity.

“HARMLESS LUNATICS.”—Dr. W. W. Godding (*American Psychological Journal*, January, 1884) makes the following pertinent suggestions in regard to the so-called “harmless” insane: “But allow that some cranks, really insane, are innoxious, and that very many of the chronic insane may safely be permitted to remain at large, that even if we wished to confine them, all the world has not at present hospitals, asylums, and prisons enough for their detention; grant all this, still would it not be well if some legal recognition was had of these chronic cases, however harmless? Let the census be made to locate them, and have some responsibility for at least certain oversight of their lives and actions. For while no amount of bonds will ever deter an insane man from acting in accord with his delusions, yet pecuniary responsibility for the conduct of the madman, when at large, will prove a wonderful stimulus to the zeal of his surety in looking sharply after any variations in the mental condition, and would influence that surety to carefully study those subtle changes in the manner and disposition of the insane man which, when no one feels a responsibility in the case, are apt to be discovered only after it is too late. Is it objected that men do not lightly enter into pecuniary responsibility for the good behavior of their fellows, and that it will be found in practice that except the man has warm personal friends or relatives who are interested in him, no one will go upon his bond, and so there will be no alternative but to place this harmless lunatic in an asylum. Well, if it indeed prove so, the community will be all the safer and the afflicted man will be better off, for the asylum of the future will be less a prison, more a home. Shall we be told that this will involve unnecessary expense to the State, and the true way to manage all these cranks and tramps and reasoning lunatics is to hold them strictly accountable under the law, and the moment they commit a crime punish them accordingly, hang them if necessary, but not tax honest people for their support in hospitals. The offender can perhaps have nothing valid to oppose to this short and easy means of making both ends meet—the ends of justice and that of the crank,—but the innocent man who stands at the other end of the shot-gun to receive the charge, he has something to say about this. From the random bullets of these madmen no one is safe,

and in view of the fatal facility with which all ranks of society provide themselves with fire-arms in America, it would seem that the peaceable, law-abiding citizen has but to wait defenceless for the crank's appointed hour. Shot down by a man whom he never saw and whom he therefore saw no reason to avoid, it is little consolation to the friends of the victim to be told that lunatics who commit homicide, while knowing the difference between right and wrong, are now hanged in order that society may be protected after the deed; what the community needs is arrest before the shooting."

A recent striking commentary on the statements of Dr. Godding is furnished by the acquittal of Rowell. Rowell, who appears to have been an epileptic, subject to post-epileptic conditions of depression, killed his wife's paramour under circumstances which seem to indicate mental weakness. Several physicians testified to his insanity, but the jury, sympathizing with the defendant on the score of his domestic misfortunes, acquitted him on the ground of self-defence. Now, had this man killed any one of his neighbors for no motive at all, in a brutal manner, the same jury would have hung him. Now this man, if insane from the cause ascribed, was a dangerous lunatic who should have been immediately sent to an hospital for the insane for life. An expert owes a duty to the people as well as to science and humanity, and however unpopular such a course in cases like that of Rowell, he should recommend on the witness-stand that such lunatics should be placed in an asylum for life. However, the experts in the Rowell case were not to blame,—the jury paid no attention to their evidence.

J. G. KIERNAN, M.D.

e.—THERAPEUTICS OF THE NERVOUS SYSTEM.

THE GYNECOLOGICAL TREATMENT OF HYSTERIA.—Flechsigs reported, at the annual meeting of the German Society of Physicians for Mental Diseases, two cases of hysteria in which the symptoms eventually disappeared after the removal of the ovaries and left broad ligament in one case, and the uterus with all its appendages in the other.

The first case had suffered for four years, in spite of all treatment, from a cycle of hysterical symptoms, including motor, sensory, and psychical, such as depression, suicidal desires, delirium with hallucinations, convulsions, etc., etc. Examination revealed an old parametritis with displaced uterus. Finally double ovariectomy was performed. The left ovary was found to contain numerous small cysts. It was noticed that at the moment when the ovary was removed the patient, though deeply chloroformed, had a peculiar attack, consisting of restlessness, deep sighing inspiration, and weakness of the heart, pointing, as the author thinks, toward a connection between the disease of

the sexual organs and the nervous disease. After the operation the condition of the patient, physically and mentally, was improved; but at the end of two weeks a cystitis developed, and with it an increase of all the symptoms. For twenty-one weeks the mental condition grew steadily worse, and then, *all of a sudden*, the patient began to improve, and she felt "as if she had been new born." There has been no return of the symptoms.

The second case suffered from hysterical convulsions, mental disturbances, etc., including suicidal tendency. Examination revealed a uterine fibroma. Later a maniacal condition developed.

The uterus and appendages were removed, Sept., 1883. Immediately after the operation there was improvement in the psychical condition, but the mania soon came on again, and increased for seven to eight weeks, when improvement rapidly set in, and patient was discharged well. There had been no return of the symptoms.

The writer summed up his conclusions as follows:

1. It is not true that ovariectomy in hysterical neuroses is useless.

2. Bad results do not always follow.

3. Ovariectomy is indicated in cases where there is evidence of the reflex character of the neurosis.

In the discussion which followed Mendel, Hitzig, Merchede, and Gudden took part, and expressed opinions in opposition to the operation.—*Centralbl. für Nervenheilkunde*, 1884, No. 19; *Neurolog. Centralbl.*, 1884, Nos. 19 and 20.

[There does not seem, however, to have been much experience with the operation in Germany, for of the ten cases collected by Flechsig only two were done in that country. Of these ten the result was favorable in four; no result in three; while three were made worse. This certainly does not include all the cases that have been operated upon for psychical disease.]

NITRO-GLYCERINE IN EPILEPTIFORM TIC.—Dr. James P. Bramwell publishes a remarkable cure effected by this drug. The patient was a man, eighty years of age, who had suffered for five months from most severe paroxysms which steadily grew worse. The attacks came on sometimes as often as twelve times in the twenty-four hours; during the night they were oftener and more violent. The patient could not wash his face without bringing on a paroxysm, and a touch of the finger, a puff of cold air, or even a mental emotion produced the same effect. After trying bromide of potash and croton chloral, Dr. B. gave drop doses of a one % solution of nitro-glycerine. The effect was almost immediate, and in four days all the symptoms were gone. There had been no return at the end of four months.—*Br. Med. Jour.*, Sept 27, 1884.

THE PHYSIOLOGICAL AND THERAPEUTIC VALUE OF STATIC ELECTRICITY.—Dr. M. V. Bundikoff describes in *Vratch*, 1883,

his observations on the physiological action and therapeutic value of franklinization in nervous disease. The therapeutic results have been thus summarized in the *London Med. Rec.* :

1. *Neuralgia* ; sixty-seven cases, sixty-one of which were of rheumatic origin, four of traumatic, and two of reflex (twenty-eight cases of sciatica, nineteen of trigeminal neuralgia, and eleven of intercostal, etc.). In the rheumatic cases, the results were very striking. Even very obstinate cases were very often cured after one or two sittings of five to ten minutes' duration; in others a great relief in both the number and intensity of the paroxysms was obtained. In some of the patients the disease returned after a while, but was less pronounced, speedily yielded to franklinization. The results were less successful in traumatic and reflex cases, where pain returned, disappeared only for fifteen or twenty minutes after a sitting, to return soon in its former degree.

2. *Rheumatism*, twenty-four cases. In chronic and subacute forms of muscular as well as articular rheumatism, static electricity acted as effectively and rapidly as in neuralgia; hence it is preferable here to galvanization and faridisation. Franklinization was useful also in acute forms; but the author is as yet unprepared to say whether it stands here superior to galvanic and faradic treatment or not.

3. *Peripheral Palsies*, ten cases (eight of rheumatic origin and two of traumatic). In rheumatic cases, a great improvement—amounting almost to a complete recovery—followed after two or three sittings. Sometimes, however, relapses occurred. In traumatic paralysis faradisation gave better results than franklinization.

4. *Chorea Minor*, one case. Temporary slight improvement.

5. *Cephalalgia*, two cases. Some improvement.

6. *Neurasthenia*, one case. Some improvement.

7. *Spinal Irritation*, two cases. Both "almost recovered."

8. *Paralysis Agitans*. Slight diminution of shaking.

9. *Impotentia Virilis*, two cases. No improvement in one; recovery in the other after four sittings.

10. *Nervous Itch*, one case. Cured after one sitting. No return.

The author concludes: "Franklinization may prove of great use, mainly in peripheral nervous affections; in the majority of, if not in all, rheumatic cases it has a greater success than the application of faradic and galvanic currents."—*Lond. Med. Rec.*, Oct. 15, 1884.

J. Stepanow has later studied the effect of static electricity (*Wratsch*, 1884, No. 27) after sittings of 5-12 minutes' duration. The following results were observed:

1. The perspiration from the franklinized portions of skin was diminished in most cases, while it was increased over the portion not franklinized. In sensitive subjects, especially when the electricity was given to the back, drops of sweat appeared on the forehead, neck, palms of the hand, and in the axillæ.

2. The quantity of urine passed in the twenty-four hours was increased, markedly so by general franklinization.

3. The pulse was not only quantitatively but qualitatively altered, so that the ascending curve became higher and more inclined, the apex more pointed, and the dichrotism more marked.

4. Franklinization not only relieves pain and invigorates the system, but also has a healing effect. In one case of chronically enlarged and hardened submaxillary and parotid glands, the former became reduced in size after sittings of twenty-five minutes' duration; after six sittings they became softer.

5. In incurable anatomical lesions (tabes) the symptoms diminish and often disappear after a while. In hysteria and renal neurasthenia franklinization also has good effect.—*Centrbl. f. nerven. Psych.*, etc., 1884, No. 16.

ACUTE MANIA TREATED WITH HYOSCYAMIN.—Dr. C. T. Ewart gives his conclusions from the use of the drug in twelve cases, six of which he reports. Nothing new is given, but his results are still of interest. The conclusion he draws "from the result of the treatment of these cases is that hyoscyamin is undoubtedly of great service in certain cases of mania where the patient is violent and cannot be restrained. It is certain in its action, quieting the patient within a quarter of an hour after administration through its effect on the nervous system. The sleep produced is very deep, and the muscular power weakened by its direct paralyzing action on the spinal cord."—*Lancet*, Aug. 16, 1884.

SALICYLATE OF SODA IN HEMICRANIA.—Finkenstein recommends (*Wratsch*, 1884, No. 29. Russian), as a result of a trial in fourteen cases, this drug, in hemicrania when the disease is of a sympatico-spasmodic and not paralytic character. He gives thirty grains and repeats the dose in a half hour. In many cases the pain disappears in 5-10 minutes after the second dose.—*Neurolog. Centralbl.*, 1884, No. 17.

TETANUS AND CHOREA CURED BY ETHER SPRAY.—Dr. G. Boutellier reports two cases (one of traumatic tetanus and one of chorea) in which he thinks recovery was effected by the use of the ether spray along the spine.

In the case of tetanus, calabar bean was also given; the spray was applied every hour for five minutes along the whole length of the spine. B. attributes recovery to the ether spray, and not to calabar bean, which he seems to have had sufficient faith in to prescribe, but not to trust.

The case of chorea was that of a child eleven years old. The symptoms were marked. At first large doses were given of opium, arsenic, calabar bean, and bromide of potash without benefit. "At the end of five weeks of treatment the poor boy was unable to walk

without falling, could not carry food or drink to his mouth, and presented, in a word, all the symptoms of complete chorea. It was then that the treatment of Subieski was thought of. The ether spray was applied along the spine morning and evening for three, later five, minutes at a time. This treatment, which was badly borne by the little patient, produced a change for the better on the second day; and at the end of five days there remained only some choreiform movements, which occurred principally when the patient was observed." At the end of five days more, cure was complete. B. concludes that this treatment was not only effective, but the improvement from it was almost instantaneous.—*Le Progrès médical*, Oct. 7: 1884.

THE WEIR-MITCHELL TREATMENT OF NEURASTHENIA.—Dr. P. A. Young reports two cases which are of interest, not because presenting any thing new, but because of the thoroughness with which the treatment was carried out and the beneficial results which therefore resulted.

The first case was an unmarried woman, thirty-four years old, who had been an invalid for fourteen years, being unable to leave her bed or couch, and generally regarded as a hopeless case. When seen she was found "reclining helplessly upon a sofa in a darkened room, speaking in the lowest whisper, eyes frequently shut to exclude the small amount of light there was, the slightest noise evidently causing great annoyance and fatigue, even to the point of swooning after being spoken to for two or three minutes," and unable to walk, body emaciated, appetite poor, etc. The Weir-Mitchell treatment was employed, being thoroughly carried out in every particular, and not in only one direction, as is often the case. "At the end of six weeks the patient was able to go to the country, and could now walk out a little. She was gradually able to go into society and attend church. The change was so great, after fourteen years of bed and couch, to be able to enjoy life, see her friends in comfort, and walk out, that the quondam invalid could scarcely believe she was the same person."

The second case was a young woman twenty-eight years old, who had been ill eight years. The principal symptom was vomiting after every meal. This had told on her health so that she had become weak, thin, etc. There was choreiform twitching.

The treatment was equally successful, the patient becoming as robust and active as she was before her illness.—*Edin. Clin. and Path. Four.*, Aug. 30, 1884.

THE COMBINED USE OF THE DIFFERENT SALTS OF BROMINE IN NERVOUS DISEASES AND ESPECIALLY EPILEPSY.—Erlenmeyer advocates the combination of the bromides of potash, soda, and ammonia, instead of one singly. The results of his experience he states as follows:

1. He has never seen the epileptic attacks so controlled by one

salt alone that they have not returned after the cessation of the treatment.

2. Each of the salts is capable of producing bromide acne, which, however, will disappear on the use of an equal dose of a different salt.

3. The combination of the potash, soda, and ammonia salts in the proportion of 1: 1: $\frac{1}{2}$ works better than any one even in larger doses.

4. The attacks do not return after giving up the use of the combined salts.

5. The acne produced by one salt disappears when the combined salts are given. He has never seen acne produced by the combined salts. To prevent impairment of digestion, he recommends the bromides to be given *after* meals in some alkaline effervescing water (seltzer, vichy, etc.)—*Centralbl. f. Nervenheil. Psych.*, etc., Sept., 1884, No. 18.

THE TREATMENT OF CHOREA.—Dr. J. Van Bibber strongly advocates seclusion, rest in bed, and massage in the treatment of chorea.—*Amer. Jour. of Neur. and Psychiat.*, May, 1884.

PARALDEHYDE AND ACETAL IN MENTAL DISORDERS.—Langreuter publishes (*Archiv. f. Psychiat. und nervenkrank.*, vol. xv., p. 7) the results of his observations, which agree with those of most previous observers. He concludes as follows:

“The action of paraldehyde in producing sleep is on the whole satisfactory. When sleep does not follow the dose (which takes place oftener than is the case with chloral) a restful state is induced. Total failure is rarely met with.

Paraldehyde is best suited for such mental conditions as are accompanied with more or less loss of consciousness, such as epileptic conditions and certain stages of general paralysis.

The medium active dose is 5–6 grains; sleep coming usually in five to ten minutes.

The action appears to be chiefly on the cerebrum. No bad effect was noticed on the respiration, heart, or other organs, even after long-continued use of the remedy. Paraldehyde possesses an advantage over chloral in this respect and also in its more rapid action. Its use even in cases of valvular disease of the heart is permissible.

The disadvantages compared with chloral consist in the large quantity which has to be given, its unpleasant taste, and its comparatively high price. Langreuter recommends the use of paraldehyde in all cases where chloral is contra-indicated, or where an hypnotic action is required to be produced rapidly.

Acetal acts very much as paraldehyde does, but is not to be recommended on account of unpleasant symptoms it is apt to induce.—*Edin. Clin. and Path. Jour.*, July 12, 1884.

NAPELLINE IN FACIAL NEURALGIA.—Grognot reports a case in which he thinks good results were obtained with this drug. It was a girl, twenty-two years old, who had suffered from attacks of facial neuralgia about every month for three years, unconnected with menstruation. On the 20th of January, 1882, a violent attack came on. 0.025 gr. of napelline was given during the day, with the effect of diminishing the pain. The napelline was continued during the next two days, but the quantity reduced to 0.01 gr. The patient continued well for two months, when the neuralgia having returned, the same treatment was employed, and again followed by disappearance of pain in twenty-four hours.—*Rev. des. Sciences médicales*, July 15, 1884.

CAUTERIZATION OF THE CLITORIS IN HYSTERIA.—Dr. V. Hinze reports a case of what appears to have been hysterio-epilepsy of a severe type, which had resisted the usual anti-hysterical remedies. From July 14th to August 12th the patient had fifteen convulsive attacks. The clitoris was freely cauterized with nitrate of silver on August 13th. From this time to September 7th, the date of the last attack, nine occurred. On September 22d she was discharged apparently well. Three cauterizations were employed in all. It is not known whether the cure was permanent. Dr. H. thinks the method deserves further trial.—*St. Petersburg. Med. Wochensch.*, 1883, No. 42.

[It may be doubted whether the improvement was due to the treatment, as this same patient was previously in the Alexander Hospital for six months with the same disease, and discharged cured ; but some weeks later, July 13th, the attacks returned.]

A CASE OF SEVERE NEURALGIA CURED BY INJECTIONS OF OSMIC ACID.—The case is reported by G. J. Turner. It was a severe ulnar neuralgia (neuritis?) of five and a half years' duration, the result of an injury to the elbow-joint, and had resisted all other treatment. The nerve was swollen, felt like a cord, and sensitive to pressure, which caused clinic spasms of the two last fingers. Two or three drops of a one-per-cent. solution of osmic acid, freshly prepared, were injected in the neighborhood of the nerve at the elbow—at first every day, then every other day, later less often. After twelve injections the pain was limited to the ulnar side of the little finger. Thirteen injections were then given in the back of the hand between the two last metacarpal bones. Finally, after an injection into the little finger, where a sensitive and thickened nerve could be felt, the pain disappeared for good.—*Centralbl. für Nervenh., Psychiat.*, etc., 1884, No. 18.

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